

YDOC-Insights

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INTRODUCTION

YDOC-Insights is an application to organize, view and visualize measurement data. You can organize your data by location in a hierarchical-structured tree. You can define multiple 'tags' per location, which are used to register measurements on (a/o a tag for registration a room temperature). 'Drag & Drop' can be used to move 'tags' as well as locations to different positions in the hierarchical structure (of course without losing the registered measurement history). Locations, tags, instruments, etc. can be mapped on a background picture to create control panels/dashboards and/or graphic navigation. Data can be printed saved and emailed in graphical (*.jpg) , tabular (*.xls) and report (*.html) form. YDOC-Insights comes with an integrated 'Data Collector Manager' to input measurements from data acquisition sources.

Features

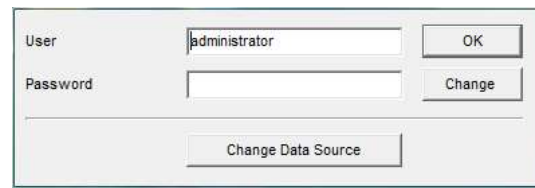
- Define as many tags as required.
- Time stamped tag values (measurements), can be collected automatically, entered manually or being calculated using other tags as input.
- Import measurements from flat text files manually (a/o csv files).
- Organize measurements by location in a hierarchical structure
- Assign 'view-only' users to locations they are permitted to consult
- Locations, tags, instruments, etc. can be mapped on a background picture to create control panels/dashboards and/or graphic navigation.
- Supports 'Drag & Drop' to move tags, locations, charts and reports
- Search for locations based on several criteria (a/o limit exceeding values)
- View recent values per location
- View summary values per location (min., max., avg., count, quantity and std. dev.)
- Playback measurements in time, with double time-axes to compare measurements in time
- View measurements in tabular form
- View measurements in graphical form
- Define your own charts (data queries as well as visual properties)
- More than 20 graphical types, like: line, column, bar, Gantt, pie, plane, bubble, arrow, point, surface, polar, radar and contour
- More than 15 graphical functions, like: curve fitting, standard deviation, moving average, cumulative, and trend
- Complete control of titles, legends, labels, axis, colors and other visual properties
- Define your own reports (by using templates and/or SQL, XML and XSLT transformation)
- Supports printing, exporting and e-mailing charts as JPEG pictures
- Supports printing, exporting and e-mailing reports as Html documents.
- Free integrated Web-Server to few recent values and simple trending.
- Optional extended Web-Server to few historical data, user defined charts and reports.
- Optional Report Scheduler to schedule automated report deliveries to SMTP-, FTP-, HTTP-Servers or Local File Systems.

Minimum System Requirements

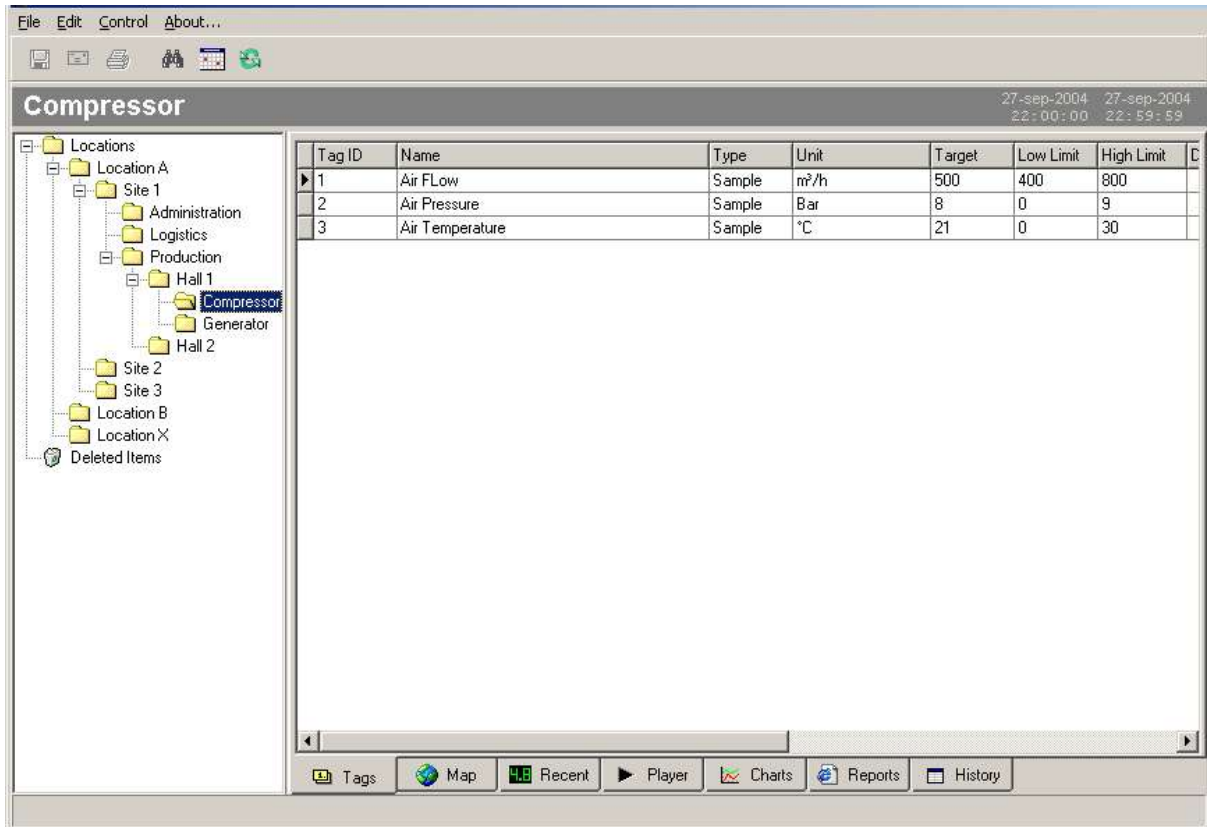
- Microsoft Windows 2012, W7, W8 or W10
- Display resolution 1024x768 or higher
- Microsoft Internet Explorer 9

OPERATION

When you open YDOC-Insights you are asked to login, at first time with an empty database, you should login with user name *Administrator* and a blank password.



User: administrator OK
Password: Change
Change Data Source



Compressor

27-sep-2004 22:00:00 27-sep-2004 22:59:59

Tag ID	Name	Type	Unit	Target	Low Limit	High Limit
1	Air FLOW	Sample	m ³ /h	500	400	800
2	Air Pressure	Sample	Bar	8	0	9
3	Air Temperature	Sample	°C	21	0	30

Tags Map Recent Player Charts Reports History

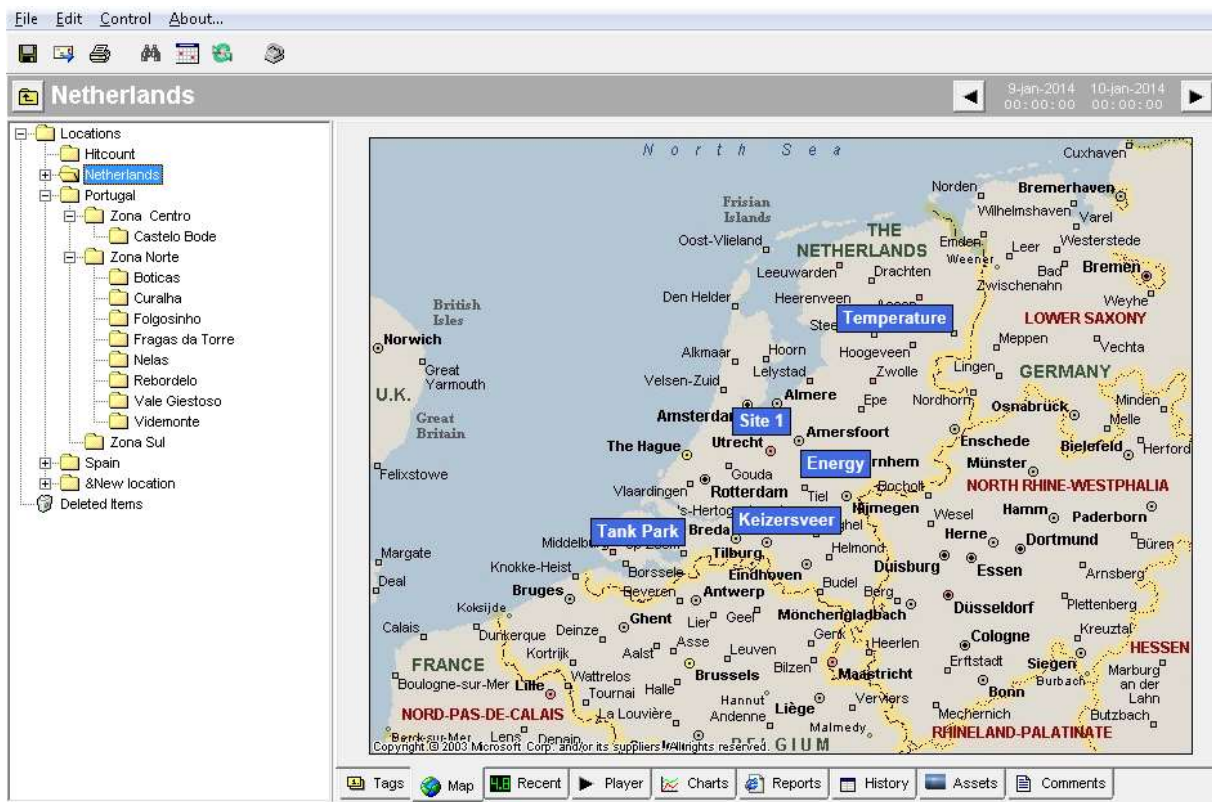
The left window shows the hierarchical location structure, while the right window shows information associated to the selected location. The displayed information at the right depends on the selected page at the bottom of the Window. There are 7 pages:

1. 'Tags', showing the list of tags associated to the selected location
2. 'Map', showing a geographical map or control panel/dashboard
3. 'Recent', showing the most recent values of the selected location
4. 'Player', playing back measurements in time
5. 'Charts', showing custom defined charts
6. 'Reports', showing custom defined html reports
7. 'History', showing measurements of the selected location in tabular form

From the 'File'-menu the contents of the right window can be printed, saved to file or send by e-mail. From the 'Edit'-menu parameters, users, locations, tags and charts can be added, deleted and modified. From the 'Control'-menu you can pop-up the "Period selector" (to define over which period you want to consult the measurements) and the "Search" dialog (to search for locations)

LOCATIONS

You can organize your measurement data by location in a hierarchical-structured tree. To define a new location, select 'New location' from the 'Edit->Locations' menu or from the menu that pops-up when you click the right mouse button. To edit an existing location, select the location from the 'Location'-list and select 'Properties' from the 'Edit->Locations' or pop-up menu. To delete an existing location, select the location from the 'Location'-tree and select 'Delete' from the 'Edit->Locations' or pop-up menu. Deleting a 'Location' is also possible by 'dragging' the location to the 'Deleted Items'-location. Deleted locations are transferred to the 'Deleted Items'-location. To delete locations forever, the locations must be deleted from the 'Deleted Items'-location as well. You can move locations to other locations by 'dragging & dropping'.



If a location has child locations they can be projected on the map as blue-labels. Clicking the labels will jump to that location. If a location has tags they can be projected on the map as well.

It's also possible to place (instrumentation) reports, charts and digital assets (e.g. pictures) on maps to construct instrumentation dashboards or control panels.

Location Properties

The screenshot shows the 'Location properties' dialog box with the following details:

- Location name:** My first remote site
- Location code:** MRS_01
- Location description:** (empty)
- Remarks:** (empty text area)
- Refresh rate of Map & Recent values page:** 60 Sec.
- Display on Map-page for:** Anybody, Visitors, Operators, Supervisors, Administrators, Nobody (all unchecked)
- Linked to data acquisition source:** Yes (checked)
- Data source identified by station code:** 5154258

A location has a/o the following fields:

Location name: Each location should obviously have a name.

Location code: As accomplishment to the name a location can have a code (the meaning of this code is up to the user for instance a zip code or serial number). The location code is also used as a reference when passing tag limit violations to the alarm system (See: chapter Messenger).

Refresh rate: The rate at which the 'Recent Values'-page and 'Tag'-values on the Map-page of this location will be refreshed.

Display on Map-page: A location label can be displayed on the map of the parent location. The position of the label on the parent map can be configured in the location properties of the parent. It's also possible to show the label to a certain type of granted user, while hiding it from another (See: chapter users).

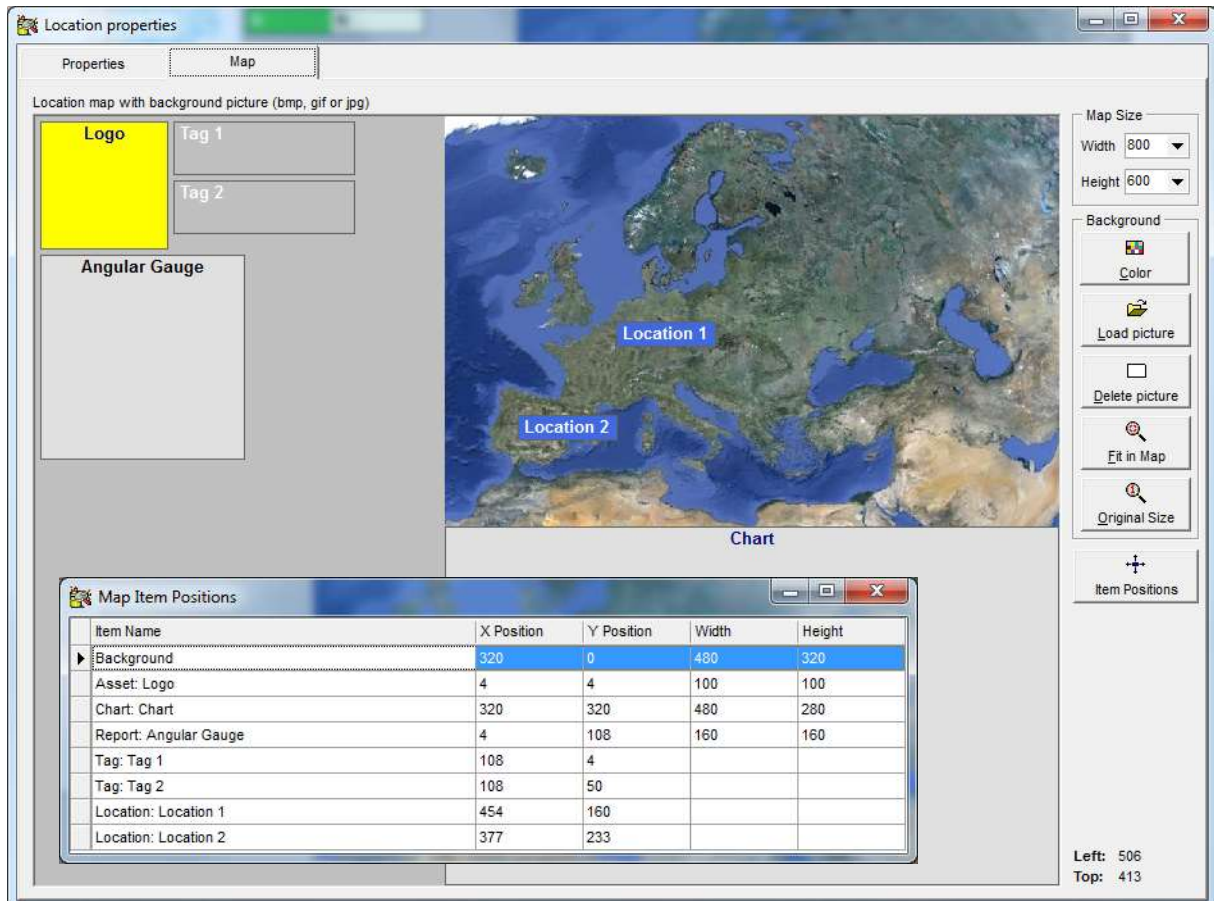
Data source identified by station code: You can specify a code to identify a data source that should be linked to this location. The code to specify depends on the rules of the 'Collector' and could be for instance a serial# of a remote data acquisition station (e.g. the S/N of an YDOC-logger).

- Its allowed to link one single data source/collector to multiple locations, not the other way around.
- When a data collector receives data from a new source (no location with a matching station code is found in the database), it will automatically create a new location with the correct station code.
- Changing a location's station code or the identification at the site of the source will break the link between them.

Location map

If a location has child locations they can be projected on the map as blue-labels. Clicking the labels will jump to that location. If a location has tags they can be projected on the map as well.

It's also possible to place (instrumentation) reports (e.g. an angular gauge), charts and digital assets (e.g. a logo picture) on maps to construct instrumentation dashboards or control panels.



Map Size: The size of the Map in pixels, if the size of the map exceeds the size of the screen, scroll-bars will be added automatically.

Background: Each location can have its own background picture (*.bmp, *.jpg or *.gif), however it's not obliged and does not have to cover the complete map. You can specify a background color for the map area that is not covered by the background picture.

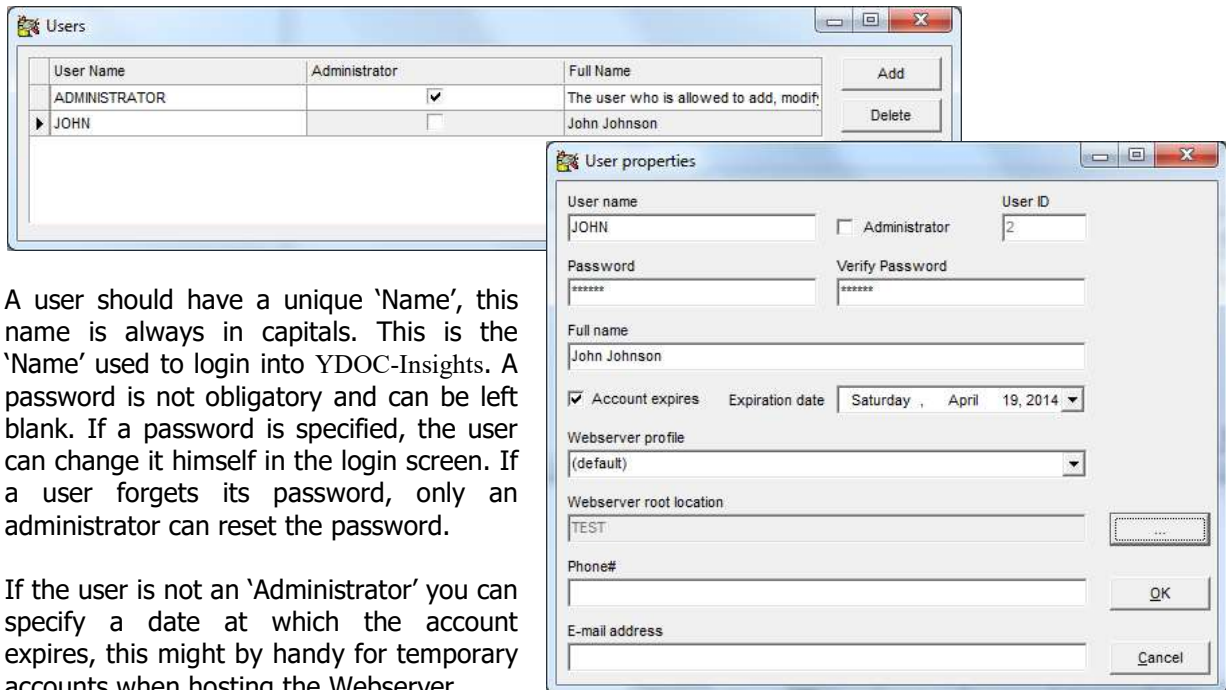
Positioning: Items (the background picture, Location/Tag labels, (instrumentation) reports, charts or digital assets) can be positioned by dragging them to a certain position or by specifying coordinates.

Click the 'Item Positions'-button to specify coordinates or to resize items.

The visual order of items from back to front is: background color, background picture, digital assets, charts, (instrumentation) reports, tag labels and finally location labels.

USERS

YDOC-Insights knows two types of users; Administrators and View-only users. An Administrator is allowed to configure (on a licensed system) YDOC-Insights and to view all locations. View-only users are only permitted to view granted locations. The maximum number of users is dependent of your license, the standard license includes the right to define 4 users. To edit users, select 'Users' from the 'Edit'-menu and the following window will pop-up:



A user should have a unique 'Name', this name is always in capitals. This is the 'Name' used to login into YDOC-Insights. A password is not obligatory and can be left blank. If a password is specified, the user can change it himself in the login screen. If a user forgets its password, only an administrator can reset the password.

If the user is not an 'Administrator' you can specify a date at which the account expires, this might be handy for temporary accounts when hosting the Webserver.

If you are hosting a webserver it could be that you want to have different web appearances for different (groups of) users and this can be accomplished by assigning different webserver profiles. See the Webserver chapter for more info regarding webserver profiles.

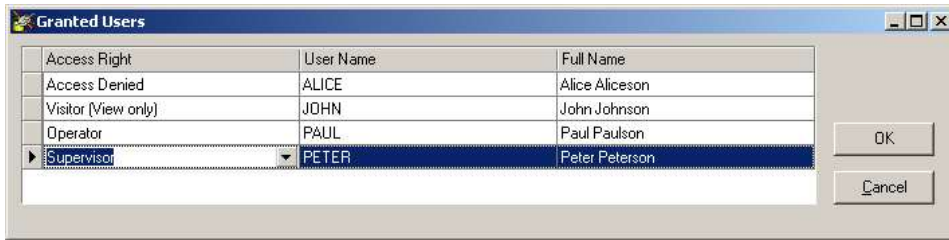
If the first location applicable to a user is deep down the hierarchic location tree, then it might be handy to specify a webserver root location for this user, so you don't have to bother him with uninteresting upper parent locations.

User rights

Default a new user has no rights to see any of the locations in the locations-tree. However it's possible to grant access to certain locations. When a user is denied access to a location, he can't access/see that location and underlying sub-locations, unless access is granted for an underlying location.

When a user is granted access to a location he can access/see that location and underlying sub-locations, unless access is denied for an underlying location..

To 'Deny/Permit' certain users to access a location and underlying sub-locations, select the location from the 'Location'-list and select 'Granted Users' from the 'Edit->Locations' or pop-up menu and the following window will pop-up:



There are five types of access rights:

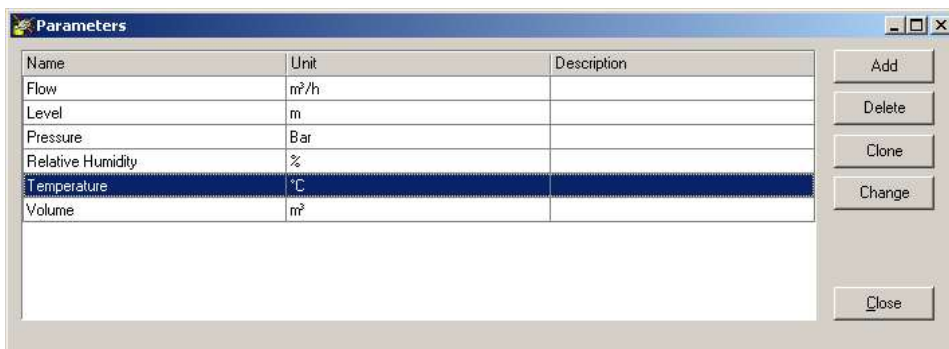
1. **Access Denied**, the user is not allowed to see/access the location.
2. **Visitor**. The user is allowed to see/access the location
3. **Operator**. The user is allowed to see/access the location and if applicable able to enter measurement values. (e.g. enter a manually measured temperature).
4. **Supervisor**, same as 'Operator', but has rights to change set points.
5. **Administrator**. An 'Administrator' has access rights to all locations and cannot be denied or granted access to an individual location. An 'Administrator' has the right to configure the application (create/delete/modify reports, charts, tags, locations etc.)

For each tag, report, chart or asset an 'Administrator' can define if it should be visible to 'visitors', 'operators' or 'supervisors'. So "Confidential" data of a certain location can be visible for a 'Supervisor' and hidden for a 'Visitor'.

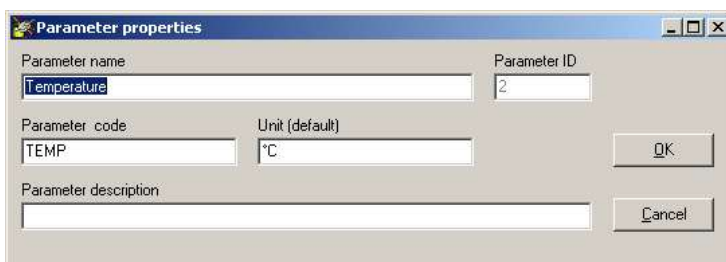
PARAMETERS

Parameters can be used to line-up similar tags with a common name and a common unit. Assume you have to measure a flow at several locations. In this case you could define a parameter named 'flow' with unit 'm³/h'. For each location you define a measurement tag for flow registration and you associated all these tags to the same parameter. To edit parameters, select 'Parameters' from the

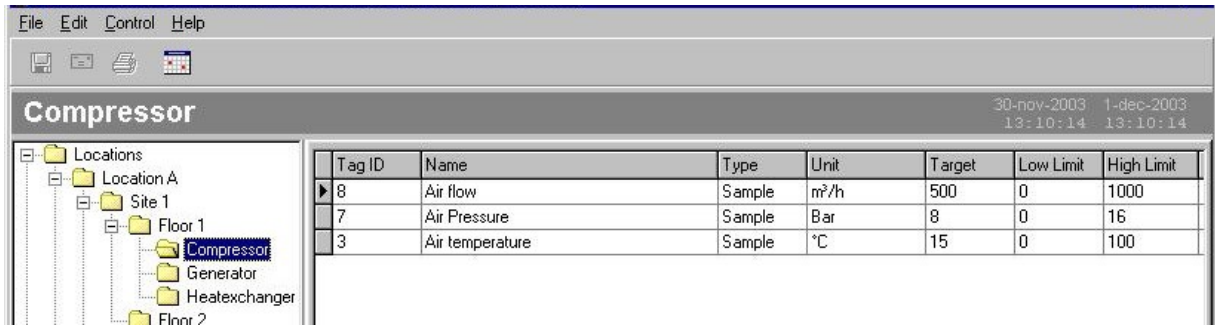
'Edit'-menu and the following window will pop-up:



A parameter should have a unique 'code', 'name' and a 'unit'.



TAGS



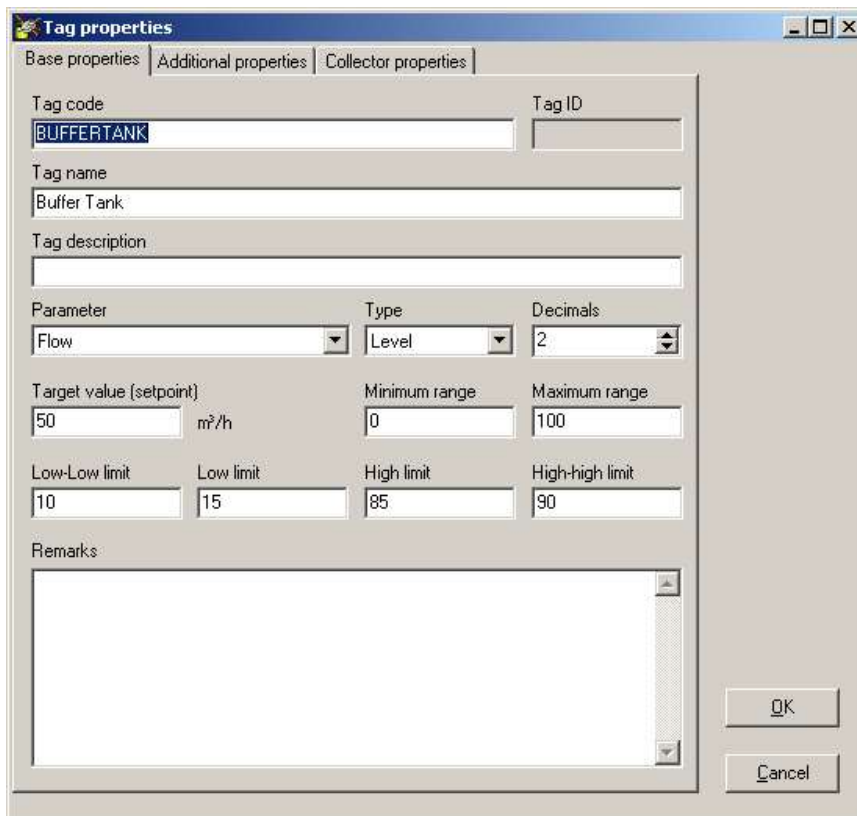
You can define several tags per location.

To define a new tag, select 'New tag' from the 'Edit->Tags' menu or from the menu that pops-up when you click the right mouse button. To edit an existing tag, select the tag from the 'Tags'-list and select 'Properties' from the 'Edit->Tags' or pop-up menu. To delete an existing tag, select the tag from the 'Tags'-list and select 'Delete' from the 'Edit->Tags' or pop-up menu. Deleting a 'Tag' is also possible by 'dragging' the tag to the 'Deleted Items'-location. Deleted tags are transferred to the 'Deleted Items'-location. To delete tags forever, the tags must be deleted from the 'Deleted Items'-location as well. You can move tags to other locations by 'dragging & dropping'.

You can change a tag's order in the list by clicking the 'Ctrl' & 'Up arrow' or 'Alt' & 'Down arrow' keys simultaneously.

The order of the list is applicable to the 'Recent values' & 'History' pages as well.

Base Properties



A tag has a/o the following base properties:

Tag code: As accomplishment to the name a tag can have a code (the meaning of this code is up to the user).

Tag name: Each tag should obviously have a name.

Tag ID: The tag ID is automatically generated by YDOC-Insights. The 'TagID' is used to uniquely identify a tag. The 'TagID' can be used in site report and chart queries. The 'TagID' is also very important when importing measurements into the database. Measurements are stored in the 'Measurements'-table, this table has three fields:

Field name	Field type
TagID	INTEGER
TimeOfMeasurement	DATETIME
MeasuredValue	FLOAT

Parameter: A tag must be associated to one of the defined parameters.

Type: The type of tag can be one of the following:

Default tag visualization, presentation and calculation behavior can differ per tag type. E.g. calculating an average wind direction is different than calculating an average temperature.

Type	Description
Sample	A measurement sample of a continues signal
Level	A level. E.g. the fuel level in a storage tank
Quantity	Each registration represents an absolute quantity. E.g. a registration of a mass from a weighting bridge.
Counter	A registration of an continues increasing counter value. E.g. a kWh counter.
Pulse	A registration of a non-continues signal. E.g. an impact.
State/Step	A measurement sample of a discrete signal.
Angle (°)	e.g. wind direction (important in case of average calculations) Minimum range must be between 0-360°. Maximum range may exceed 360° to be able to set alarm boundaries on a Northly direction.
Latitude	e.g. GPS-coordinate
Longitude	e.g. GPS-coordinate

Number of Decimals: Specify the number of relevant decimals to be displayed.

Target: The target value (set point) for this tag.

Range: Specify the Min. and Max. range for the tag. Measurements outside this range will not be displayed. The Y-axis of the 'Player' will be scaled to the specified range.

Limits: If a measurement is outside its limits it will be displayed in red and if required an alarm can be passed to the Messenger for further dispatching.

Additional Properties

A tag has a/o the following additional properties:

The screenshot shows the 'Tag properties' dialog box with the 'Additional properties' tab selected. The dialog has three tabs: 'Base properties', 'Additional properties', and 'Collector properties'. The 'Additional properties' tab contains the following sections:

- Display options:** A checkbox at the top reads 'This tag is a calculated tag, using other tags as input'. Below are three columns of checkboxes for 'Display on Map-page for', 'Display on Recent-page for', and 'Display on History-page for'. Each column lists 'Anybody', 'Visitors', 'Operators', 'Supervisors', 'Administrators', and 'Nobody'. In all three columns, 'Visitors', 'Operators', 'Supervisors', and 'Administrators' are checked, while 'Anybody' and 'Nobody' are unchecked.
- Alarm Options:** A text block explains the Alarm Scanner. Below are three radio button options: 'Alarm if values are out of range' (checked), 'Alarm if the most recent value is out of range.', and 'Alarm if the most recent average value is out of range.'. A 'Calculate average over time period' field is set to '00:00:00'. Below that, 'Alarm if no value is recorded within:' is checked with a field set to '00:30:00'.
- Name Table:** A dropdown menu is set to 'None'.
- Product density:** A checkbox 'This Tag is a product density tag and is linked to' is unchecked. Below it is a 'Product Tag' field with an empty text box and a browse button.

Buttons for 'OK' and 'Cancel' are located at the bottom right of the dialog.

Calculated tag: If switched on, the measured value is a value calculated based upon the measured values of other tags. See chapter: 'Calculation properties'

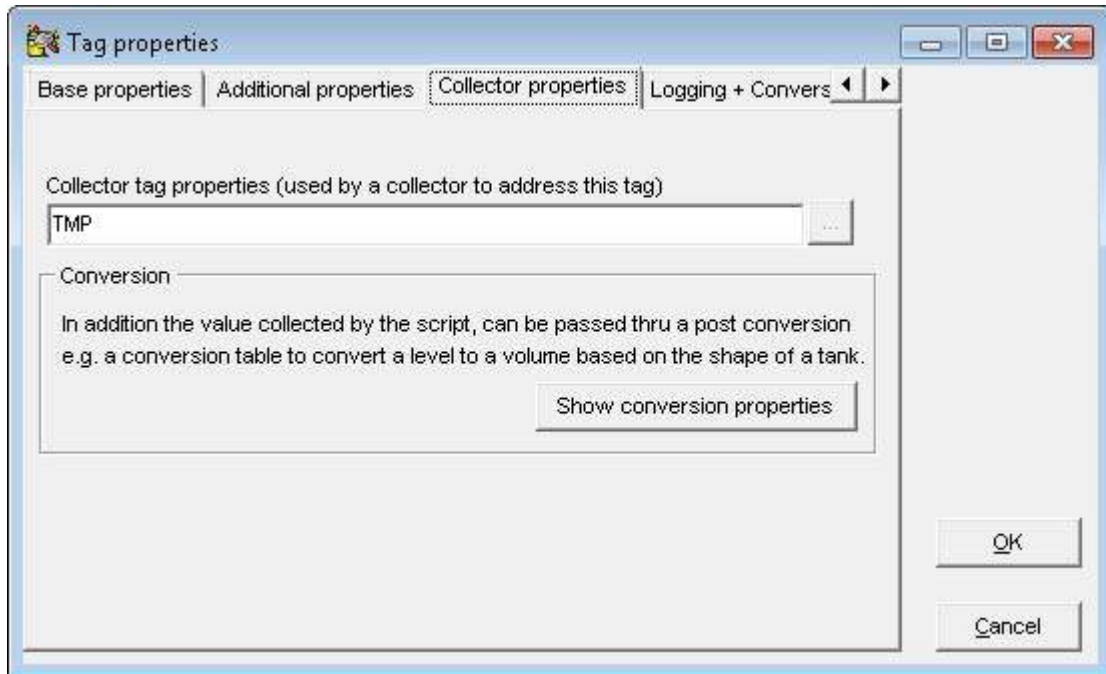
Display option: At default a tag is displayed on the 'Recent values'- and 'History'-page for all granted users. However some tags may not be that interesting to be displayed on a certain page and can therefore be marked as invisible for that particular page. It's also possible to show the tag to a certain type of granted user, while hiding it from another (See: chapter users).

Alarming: If the Alarm Scanner is running (see chapter: Messenger) checking the Alarming box will pass the alarms for this tag to the Messenger. When exceeding a low or high limit a 'Warning' will be passed to the Messenger. When exceeding a low-low or high-high limit a 'Error' will be passed to the Messenger. To avoid bouncing alarms it is required to specify a hysteresis value.

Record rate: YDOC-Insights can report an 'Error' if the value of a tag is not recorded in time. Please specify a reasonable 'record rate'. If you specify the 'record rate' to almost matching or higher than the real record rate, alarming can become very nervous. If you specify a low 'record rate', it will take longer before you get notified about it.

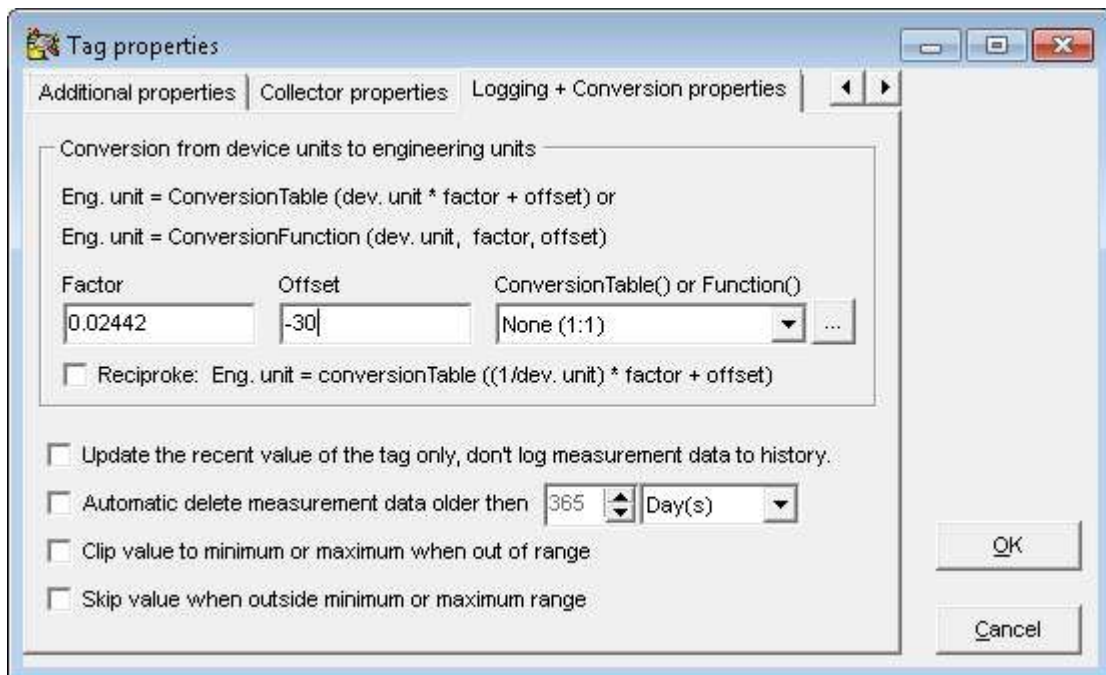
Name Table: If you want to display measured values as texts instead of numbers, you can define tables to map number ranges to texts. Name tables can be edited via the 'Menu'-bar->Edit->Name Tables.

Collector Properties



A tag

Collector tag properties: If a YDOC-Insights location is bound to a 'Data Collector' then tags assigned to this location can be linked to tags/channels of the DAQ-source. How a YDOC-Insights tag can be linked is very specific and is dependent of the type of 'DAQ'-source. For an YDOC-logger this code should equal a data logger 'parameter code'.



Some 'DAQ'-source are not recording physical values in their right engineering units, but in raw ADC-values. For instance a temperature ranging from -30 to 70 C could be recorded as an ADC-value ranging from 0-4095. By supplying a **factor** and an **offset**, the ADC-value can be re-scaled to the right engineering value. A factor can be calculated as: $(\text{Max. Eng. value} - \text{Min. Eng. value}) / (\text{Max. ADC Value} - \text{Min. ADC Value})$ in this example the factor will be: $(70 - (-30)) / (4095 - 0) = 0.02442$ The offset can be calculated as: $\text{Min. Eng. value} - (\text{Min. ADC-value} * \text{factor})$ in this example the offset will be: $-30 - (0 * 0.02442) = -30$

In some other cases it could be that the engineering value couldn't be calculated with a factor and offset. Assume you want to register the flow in a river, but you measure level in ADC-values, in that case you could first apply a factor and offset to re-scale to (cm) and then apply a conversion table to re-scale (cm) to (m³/h).

Conversion tables can be edited via the 'Menu'-bar->Edit->Conversion Tables.

Beside an example of a conversion table:

	Device value	Engineering value
1	0	0
2	15	0.01
3	20	0.06
4	25	0.3
5	30	0.8
6	35	1.7
7	40	3
8	45	4.4
9	50	5.8
10	55	9

Calculation Properties

Input Tag ID	Code	Name
518	VOLUME	Volume
516	DENSITY	Density

Calculation based on the most recent instantaneous input values
 Calculation based on the most recent aggregated input values

Aggregation options
 Aggregation period: 01:00:00 (hh:mm:ss) Median span: 100 %

Multiple aggregated values per period (e.g. a rolling average)
 One aggregated value per period, left aligned in time window
 One aggregated value per period, centered in time window
 One aggregated value per period, right aligned in time window

Conversion Table
 In addition the value calculated by the script, can be passed thru a conversion table e.g. to convert from a level to a volume based on the shape of a tank.
 None (1:1)

For a 'calculated tag' the measured value is calculated from the measured values of other tags. As soon as one of these input tags is recorded, a calculation is triggered and a query is performed to get

the recent values of all the input tags. This can be either the most recent instantaneous recent values or the most recent values aggregated over a certain **aggregation period**. The aggregated value (e.g. an average) can be calculated over all values or over a portion ('Median span') of the values with the Median as center. If the aggregation period is set to **00:00:00**, then the actual aggregation period is dynamic and will be set to the time between two successive registrations, e.g. to calculate the delta count between two counter registrations.

Aggregation options:

- a) Multiple aggregated values per period. The aggregation will be performed over a shifting time window, e.g. to calculate a rolling average. Each time a new input value is recorded a calculation will be performed and a calculated record will be recorded. The aggregation will be performed over a period right aligned in time with the timestamp of the recorded input value.
- b) One aggregated value per period. The aggregation will be performed over a discrete time window and only one value will be recorded (e.g. if the period is 1 hour only one value per hour will be recorded). Each time a new input value is recorded a calculation will be performed and **a)** a new record will be recorded if no value was recorded within the aggregation period yet or **b)** an existing record in the aggregation period will be updated. The timestamp of the calculated record can be set to the begin, middle or end time of the aggregation period.

Calculation Scripts:

When you define a calculated tag you can choose from 5 basic functions (copy, sum, subtract, multiply and divide), but you can also load a calculation script from disk. The following standard calculation scripts are pre-installed on your system.

Counter To Quantity.pcs, which calculates the difference between the maximum value and minimum value over the selected aggregation period or registration interval of an input tag of type counter. (E.g. to calculate the energy usage based on a kWh counter)

Counter To Rate.pcs, which calculates the rate per hour at which the minimum value is changed to the maximum value over the selected aggregation period or registration interval of an input tag of type counter (E.g. to calculate the flow rate based on a water counter)

Dewpoint.pcs, which calculates the dew point based on a Temperature (C) and Relative humidity (%) input tag.

GPS drift.pcs, which calculates the GPS drift in meters based on the difference between a recorded position and a target position. The script requires a latitude and a longitude input tag.

Wet bulb temperature.pcs, which calculates the wet bulb temperature based on a Temperature (C), a Relative Humidity (%) and a Barometric Pressure (kPa) input tag.

Windchill.pcs, which calculates the wind chill based on a Temperature (C) and Wind speed (m/s) input tag.

Switch on high limit.pcs, which sets the value of a tag to 1, if one of the input tags exceeds its high limit set point. Sets the value to 0 again, if all input tags are below their high limits.

Switch on low limit.pcs, which sets the value of a tag to 1 if, one of the input tags falls below its low limit set point. Sets the value to 0 again, if all input tags are above their low limits.

Custom Calculation Scripts:

A user definable script (Microsoft J-Script) does the actual calculation. The calculation is fed by a multi-dimensional J-Script Array supplying the data to be used in the calculation.

The Array has the following format:

```
var aInputData=
[
    [<first inputTagID>,<tagCode>,<average or instant. Value>,<Min. value>,<Max.
    value>,<Count>,<Time of min. value>,<Time of max. value>, [<Values>] ]

    [<sec. inputTagID>,<tagCode>,<average or instant. Value>,<Min. value>,<Max.
    value>,<Count>,<Time of min. value>,<Time of max. value>, [<Values>] ]
    ...
    [<last inputTagID>,<tagCode>,<average or instant. Value>,<Min. value>,<Max.
    value>,<Count>,<Time of min. value>,<Time of max. value>, [<Values>] ]
]
```

For each input tag there is a sub-array in the aInputData array. The order of the sub-array's is accordingly to the order of input tags. Each sub-array has the following 9 fields:

- 1) inputTagID, the unique ID of the tag (integer)
- 2) tagCode, the userid defined code of the tag (string)
- 3) average or instantaneous. value, the most recent average, averaged **median** or instantaneous value (float). If the input tag is of type '**Counter**', the value is the last counter value within the aggregation period.
- 4) Min. value, the minimum value within the aggregation period. This value equals the instantaneous value, if no aggregation period was specified.
- 5) Max. value, the maximum value within the aggregation period. This value equals the instantaneous value, if no aggregation period was specified.
- 6) Count, the number of input values found within the aggregation period. Count is 1, if no aggregation period was specified.
- 7) Time of min. value, the timestamp of the Minimum value. (float, the number of days that have passed since 12/30/1899. The fractional part is the time of day).
- 8) Time of max. value, the timestamp of the Maximum value. (float, the number of days that have passed since 12/30/1899. The fractional part is the time of day).
- 9) Values is a sub-array listing all the values within the aggregation period ordered by timestamp.

In case the input tag is of type '**Counter**', the counts per aggregation period can be calculated by subtracting the Minimum from the Maximum counter value or by the difference between the first and the last value in the <Values> sub-array. (**Note:** to be able to calculate the correct quantity, the first counter value before the aggregation period will be included in the calculation as well).

The calculation script as shown below, performs a multiplication of the average or instantaneous values of all input tags.

```
function CalculateValue(aInputData)
{
    var dResult=1.0;

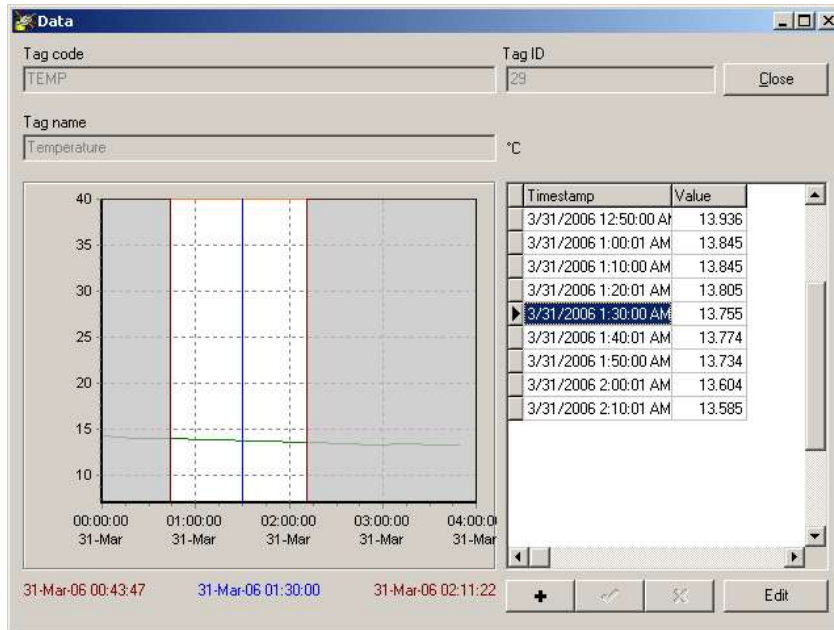
    for(var iTag=0; iTag<aInputData.length; iTag++)
    {
        if(aInputData[iTag][5]<=0) return;
        dResult *= aInputData[iTag][2];
    }
    return dResult;
}
```

The function should return a number (float) as the result of the calculation. A recording will be made to the database, if a valid number is returned only. If wished, returning nothing or a non-number can prevent a recording to the database.

Tag Data

Normally tag data is collected automatically, however it could be that the collected data needs to be corrected or that you want to insert some values manually.

To edit tag data, select the tag from the 'Tags'-list and select 'Data' from the 'Edit->Tags' or pop-up menu.



The tag data is shown in chart and tabular form. The chart shows all the data over the selected period. The chart has a left and a right marker (both colored maroon), which can be dragged horizontally to mark a certain portion of the data, only this data will be displayed in tabular form. The chart has a data cursor (colored blue), that can be used to select a particular data record in the table.

To enter a single data record manually, click the '+' button below the table and enter a valid timestamp and value.

Click the 'Edit'-button to edit either the single selected record or all graphically marked records.

The following operations are possible:

- 1) **Set** the value(s) of a single record or all marked records to a fixed value.
- 2) **Multiply** the existing value(s) of a single record or all marked records with a certain factor.
- 3) Add an **offset** to the existing value(s) of a single record or all marked records.
- 4) Add an offset **slope** to the existing value(s) of a single record or all marked records. The slope is linearly scaled over the graphically marked period. So a record in the middle of the marked period will be added with an offset equal to a half of the difference between the minimum and maximum slope value.
- 5) Convert the value(s) of a single record of all marked records by using a **conversion table** (Conversion tables can be edited via the 'Menu'-bar->Edit->Conversion Tables).
- 6) **Delete** a single record or all marked records.
- 7) **Restore** a single record or all records within the marked period from an archive with original values. As soon as a record is modified/deleted for the first time, its original value will be archived. Note: following modifications will not alter the originally archived value.

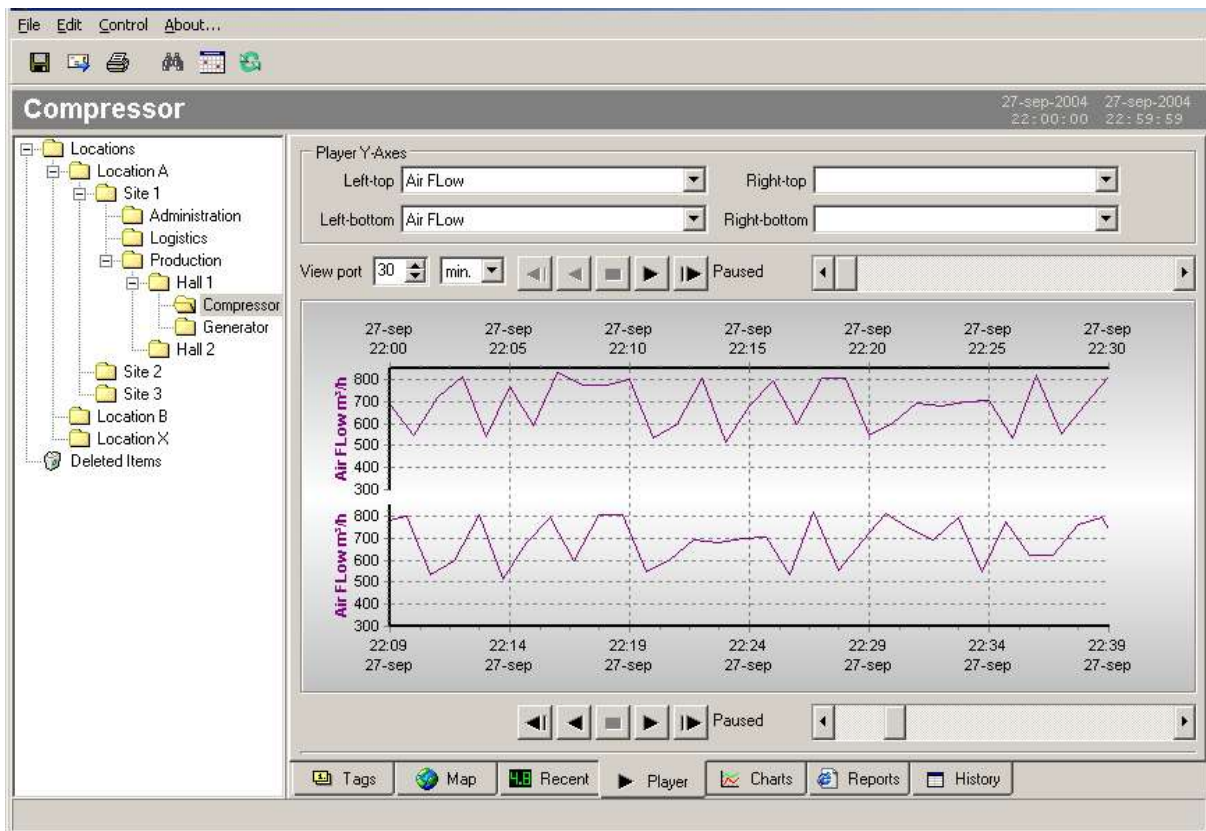
RECENT VALUES

The 'Recent'-page shows the most recent values of the tags associated to the selected location in tabular form.

Tag	Value	Unit	Timestamp	Target	Low-Limit	High-Limit
Air flow	544,00	m³/h	1-dec-2003 02:02:00	500,00	400,00	800,00
Air Pressure	8,90	Bar	1-dec-2003 02:02:00	8,00	0,00	16,00
Air temperature	72,00	°C	1-dec-2003 02:02:00	15,00	0,00	100,00

This sheet can be printed, saved or e-mailed

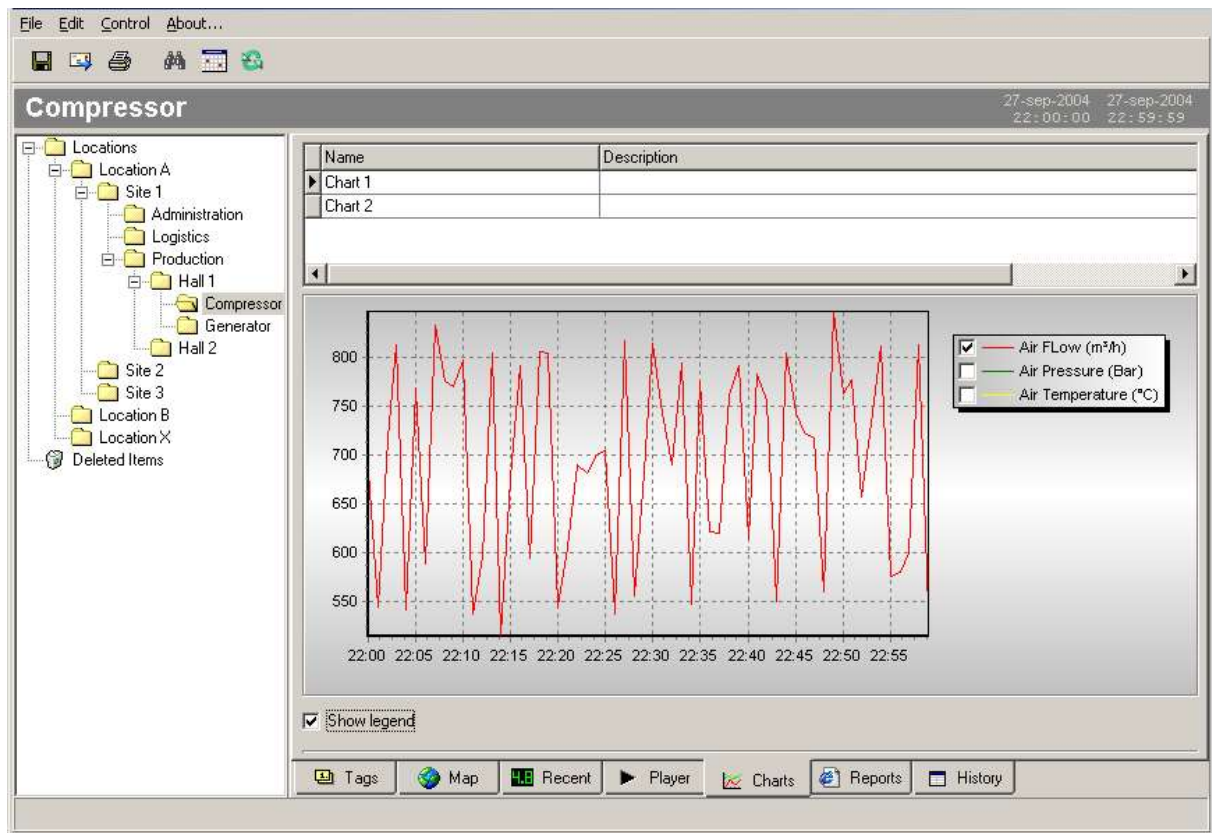
PLAYER



The 'Player'-page is used to play back measurements in time.

With the 'Player' measurements can be played back and forward in time. The player chart is divided into two vertical parts, which are having their own time-axis and their own 'player'-controls. Each vertical part has a left and right Y-axis. For each Y-axis a tag associated to the selected location can be selected. Because the same tag can be selected in the upper part as well as in the lower, it is possible to compare measurements of the same tag in time.

CHARTS



The 'Chart'-page is used to show user defined charts.

You can define several charts per location. When creating a new chart, YDOC-Insights generates a default chart based on the tags you selected. The default chart displays the measurements of max. 8 tags over the selected period. The user may alter the queries or modify the visual properties. A/o attaching tags to a specific Y-axis, changing colors or adding function series (e.g. curve fitting or moving average). Charts can be printed or saved or e-mailed as JPEG compatible pictures.

To define a new chart, select 'New chart' from the 'Edit->Charts' menu or from the menu that pops-up when you click the right mouse button. To edit an existing chart, select the chart from the 'Charts'-list and select 'Properties' from the 'Edit->Charts' or pop-up menu. To delete an existing chart, select the chart from the 'Charts'-list and select 'Delete' from the 'Edit->Charts' or pop-up menu. Deleting a 'Chart' is also possible by 'dragging' the chart to the 'Deleted Items'-location. Deleted charts are transferred to the 'Deleted Items'-location. To delete charts forever, the charts must be deleted from the 'Deleted Items'-location as well. You can move charts to other locations by 'dragging & dropping'.

You can change a chart's order in the list by clicking the 'Ctrl' & 'Up arrow' or 'Alt' & 'Down arrow' keys simultaneously.

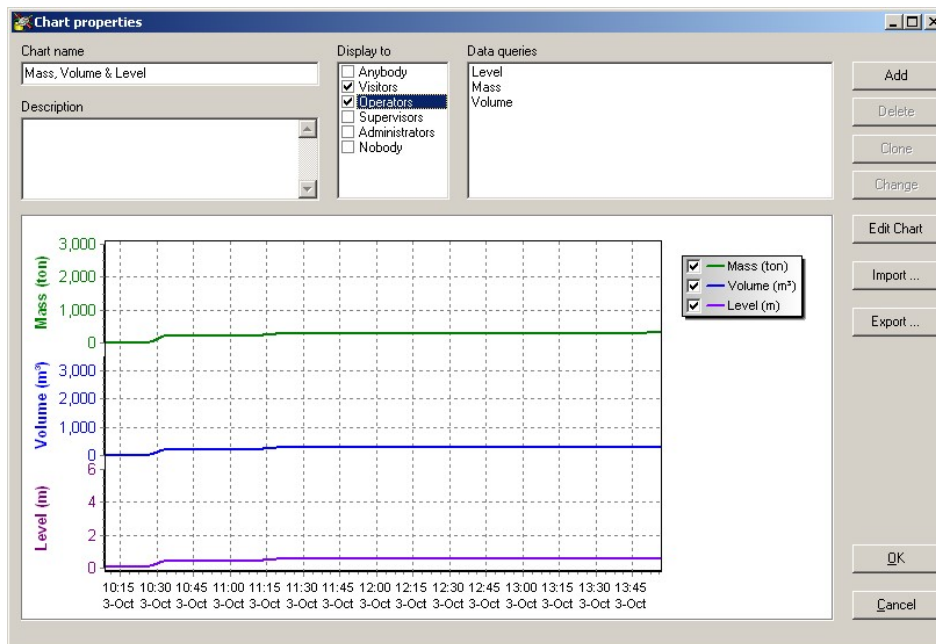
Note 1: If you create new charts by cloning it from others (or by cloning a location containing charts), the clones and original chart will share their queries and visual properties. If you change a query or a visual property within a clone or the original, your changes will be applied to all clones and the original as well. You can of course "unshare" a clone from others and the original chart as well. An original chart shared to by clones can't be permanently deleted and when you try, it will stick in the root of the 'trash can' location.

Note 2: Charts can be included in HTML reports as well, you can do it by adding HTML img-elements (in lower-case) to the HTML code of the concerned report as follows: ``, where x is the ID of the chart to be included in the HTML-report.

Defining a chart

Note: Knowledge of SQL is required to define custom data queries!

Chart properties exist out of data queries (which are supplying the data points for the chart series) and visual properties. Click the 'Add' or 'Clone' button to create new data queries. You may define as much queries as required. To modify or delete an existing query, select the query from the list and click the 'Delete' or 'Change'-button. To edit the charts visual properties click the 'Edit Chart'-button.



Display option: At default a chart is displayed to all granted users. However it's possible to show a chart to a certain type of granted user, while hiding it from another (See: chapter users).

Defining chart queries

The Data needed to draw chart lines (Series) has to be extracted from the database. YDOC-Insights uses SQL queries to extract data from the database. The meaning of a query is to retrieve a list of records from a database, according to defined search criteria. In the context of YDOC-Insights, every record represents a Series point. Consult chapter "Binding Series to a Query" to see how X, Y and Z values can be bound to fields in a record.

Chart properties

Query name
Air flow

Query code
SELECT timeOfMeasurement, MeasuredValue
FROM measurements
WHERE tagID=8 AND timeOfMeasurement>=:startOfPeriod AND timeOfMeasurement<:endOfPeriod

You may use the period variables :startOfPeriod and :endOfPeriod within the query.
These variables will automatically be set to the selected period of Promis.

Resulting 'data-set'

timeOfMeasurement	MeasuredValue
30-11-2003 13:11:00	583
30-11-2003 13:12:00	590
30-11-2003 13:13:00	580
30-11-2003 13:14:00	583
30-11-2003 13:15:00	584
30-11-2003 13:16:00	584
30-11-2003 13:17:00	581
30-11-2003 13:18:00	582
30-11-2003 13:19:00	583

Test

OK

Cancel

Query name: Specify a unique name for the query.

Query code:

You have to specify a complete 'SQL SELECT' statement. You may use the parameters **:startOfPeriod** and **:endOfPeriod**, to narrow the number of records in the Query to the selected period (To select a period, open the "Period Selector" from the 'Control-menu').

Besides **:startOfPeriod** and **:endOfPeriod**, you can also use similar parameters rounded down or up to the nearest discrete time boundaries; **:startDayOfPeriod**, **:startMonthOfPeriod**, **:startQuarterOfPeriod**, **:startHalfYearOfPeriod**, **:startYearOfPeriod**, **:endDayOfPeriod**, **:endMonthOfPeriod**, **:endQuarterOfPeriod**, **:endHalfYearOfPeriod** and **:endYearOfPeriod**.

Besides time parameters you may use the parameter **:locationID** and any of your own defined Parameters (see: previous chapter).

A simple query could look as follows:

```
SELECT timeOfMeasurement, MeasuredValue FROM Measurements WHERE  
tagID=8 AND timeOfMeasurement>=:startOfPeriod AND  
timeOfMeasurement<:endOfPeriod
```

This query retrieves the measurements of the tag with TAGID=8 over the selected period. The list returns a table with two columns, *TimeOfMeasurement*, which can be used to bind to the X-axis of a Series and *MeasuredValue* that can be bind to the Y-Axis of a series. **Note:** MeasuredValue is returned in the default unit of the parameter associated with the tag.

When creating a "new"-chart, YDOC-Insights generates a chart with up to 8 default queries. Each query results in a list of measurements over the selected period for one of the tags of the concerned location.

A default query looks as follows:

```
SELECT timeOfMeasurement, MeasuredValue, loLim, hiLim,  
(MeasuredValue*altunitfactor+altunitoffset) As AltValue,  
(LoLim*altunitfactor+altunitoffset) As AltLoLim, (HiLim*altunitfactor+altunitoffset) As  
AltHiLim FROM tags, params, measurements WHERE tags.parID=params.parID AND  
tags.tagID=measurements.tagID AND measurements.tagID=8 AND  
timeOfMeasurement>=:startOfPeriod AND timeOfMeasurement<:endOfPeriod
```

This query retrieves also the measurements of the tag with TAGID=8, but it accomplishes it with some additional information. Besides the measured value it returns the low and high limit values, which is defined in the "tags"-table. It also returns the measured value in the possible alternative unit. E.g. level measurements could be stored in "meter" but you want display them in "liter". The conversion info between default units and the alternative units is stored the "params"-table. Therefore the query uses three tables: 1) the 'Measurements'-table, which is connected via its "tagID" to 2) the "tags"-table, which is connected via its "ParID" to the "params-table".

The "measurements"-table has three fields:

TagID, TimeOfMeasurement and MeasuredValue

The "tags"-table has a/o the following fields:

TagID, ParID, TagName, Target, MinRange, LoLim, HiLim and MaxRange

The "Params"-table has a/o the following fields:

ParID, Unit, AltUnit, AltUnitFactor, AltUnitOffset

AltUnitFactor and AltUnitOffset are specifying how to convert from the default unit to the alternative unit. The formula is as follows:

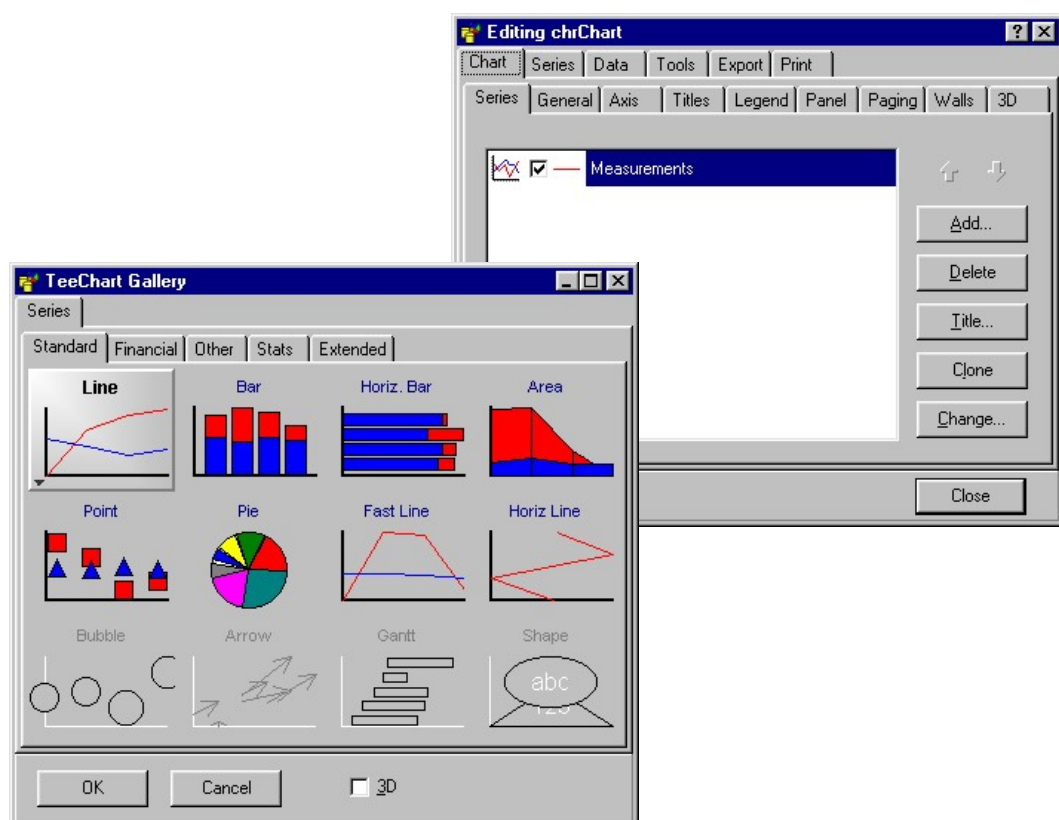
*value alt. Unit = measured value * factor + offset.*

Visual properties

Charts can be built and implemented using the Chart Editor. You may define the Chart appearance, titles, legend characteristics and 3D aspect.

Everything comes together to make the final Chart, with Chart axes being the interface between Chart and Series. A Series has data and its values will influence the label characteristics of the Chart axes. The axes appearance, colors, grid frequency and label fonts may all be defined for the Chart before adding data Series. YDOC-Insights will make a best estimate of most values to minimize the need for you to manually define Chart and Series properties.

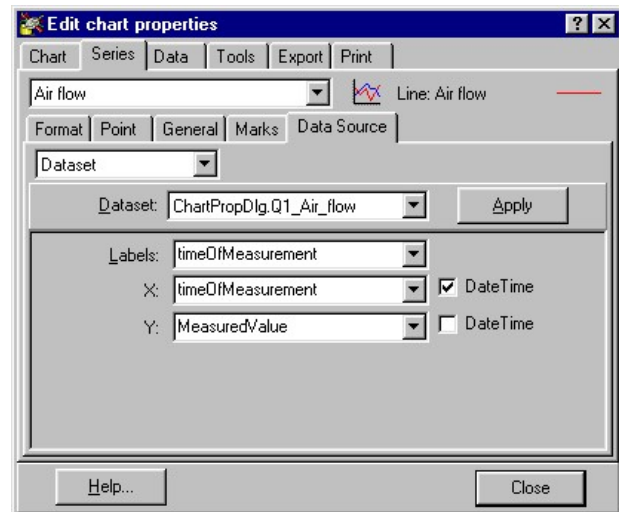
The Chart Editor contains access to most commonly used Chart properties. To add a new Series, from the Chart Editor click the 'Add' button and select the Series type from the Series Gallery. If, after selecting a Series type now, you wish to change it later you may do so (with a few exceptions where Series data content may be incompatible) by returning to the first Editor screen and selecting the 'Change' button.



Binding Series to a Query

To bind a Series to a Query, you have to take the following steps:

1. From the Chart Editor click the 'Series' tab and select the appropriate series name.
2. From the 'Series' tab click the 'Data Source' tab and select 'Dataset' from the first selection list.
3. Select the appropriate 'Query' from the 'Dataset' list. (Consult the chapter "Defining Queries" to see how Queries can be defined)
4. Specify which fields from the Query should be used as the Series points: X, Y and Z values and labels.



Binding Series to a Function

With the 'Chart Editor', on the first Chart page, click the 'Add' button to add a new Series to the Chart. In the 'Series Gallery' choose the 'Functions' tab to select the Function you require. Each Function is presented as a Line Series, you may change the Series Type associated with the Function later by clicking the 'Change' button on the first Chart page. Function definitions are easily changed afterwards on the 'Data Source' page of the Function Series.

Using the 'Chart Editor', after adding a Function, the Function Series' 'Data Source' page will show a list of available Series for inclusion in the Function definition. Here you may change the Function Type you wish to apply to the Series and select Series from the 'Available' list and add them to the right 'Selected' list.

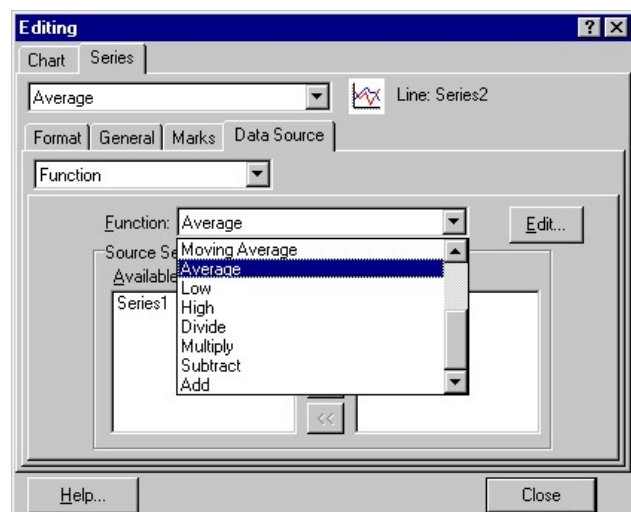


Chart Display Parameters

Chart display features are those which affect the overall appearance of the Chart. They include those properties and methods that define the color of the Chart background, Titles and their position, margins, borders and bevels, background images, frame and axis visible, pen colors and widths, 3D, walls, etc.

The overall Chart appearance characteristics are a grouped into these categories: *General, Axis, Titles, Legend, Panel, Wall and 3D*

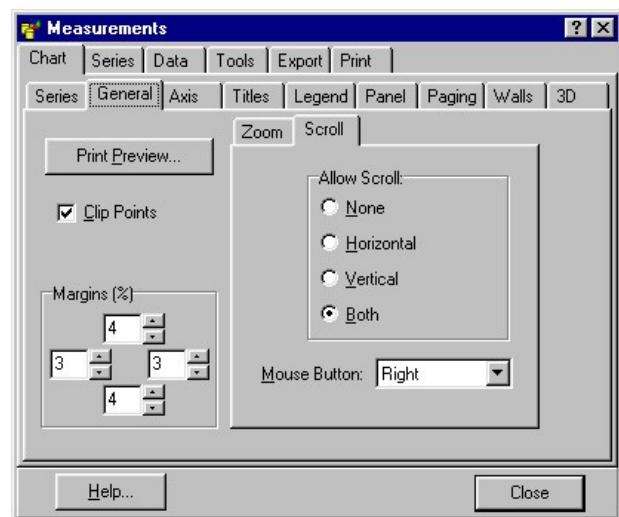
These are the groupings you will find if you open the Chart Editor and browse the Chart pages. Other properties affect the 'look' of your Chart. These include Series colors and mark characteristics, individual Axis and Grid display properties and labeling.

Right click on the chart and select 'Properties' from the menu to access the Chart Editor. The first page is the Series page which is empty of Series at the moment and which we'll look at in another tutorial. Select the second Chart tab 'General' to access the General Chart properties page.

General Chart Options

General options include Print Preview and Chart plus the 3 following sections: *Margins(%)*, *Zoom and Allow Scroll*.

Margins: Margins are defined as the distance between the Chart Border and the Chart Frame and are expressed as a percentage of the overall dimensions of the Chart Panel. Moving the spin boxes in the Chart Editor Margins box will show you at design time the effect of changing each Margin.

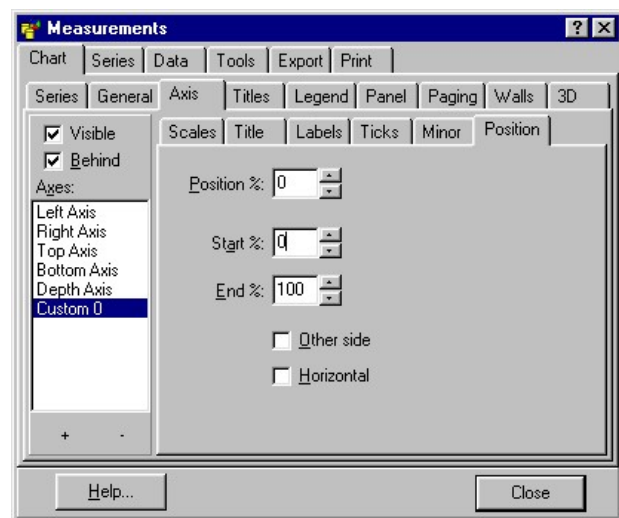


Axis Properties

Control of the axes is quite an involved area at its greatest level of intricacy and is dealt with in greater depth in a later tutorial. Here we will cover the fundamentals of Axis and Frame display.

The second Chart page holds the properties for defining axis and frame characteristics.

There are 5 'Standard' axes in the Chart. Left, Top, Right, Bottom and Depth. The Chart Frame displays as a surround to the Chart's plot-able area and has no data corresponding features. The Depth initializes by default as not Visible. All other Axes are visible from the moment that a Series is added to the Chart and associated with those Axes (Left and Bottom as default).



The key properties to enable display of axes and frame are:

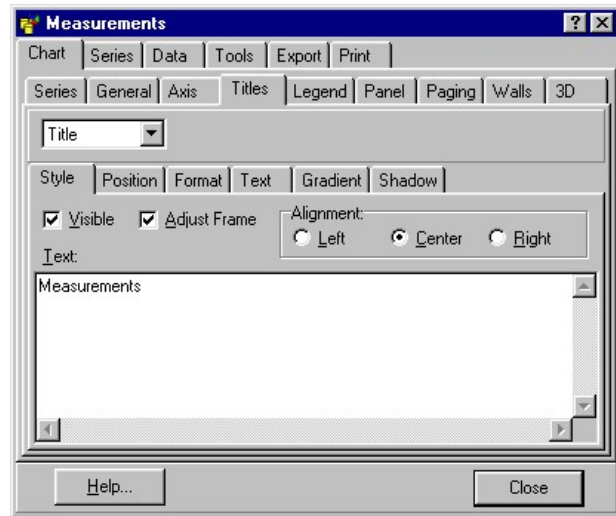
Show Axis: The *Show Axis* checkbox enables or disables display of all 4 axes. If the Frame is visible then a Chart surround is still visible when the axes are hidden. The result will be the appearance of a larger Chart as no area is reserved for axis labels.

Axis: Left, Right, Top, Bottom and Depth Visible: Select the radio button of the axis that you wish to display or hide and toggle the Visible checkbox to control the display for that specific axis.

Custom Axis: Custom Axis can be added or removed by clicking the '+' or '-' button below the Axis list. This can amongst other be used to create stacked Y-axes. Assume you want to have two stacked Y-axes. Click the '+' button and click the 'Position' Tab and define a 'Start' value of 52% and an 'End' value of 00%. Click the '+' button again and define a 'Start' value of 0% and an 'End' value of 48%. The second axis is stacked above the first. To become visible the axes must be bound to one or more Series (See the 'General' Tab of a 'Series Properties' page).

Titles Properties

The Titles page of the Chart Editor controls the characteristics of the Chart Titles, Header and Footer.



The following types of Titles are used:

- 1) Title, positioned above the chart. The default value of Title equals the chart title as defined within 'Database Properties'. The user may overrule the chart title.
- 2) Sub Title, positioned below the 'Title', is used by YDOC-Insights to show the selected Query parameters. The user can't overrule the text, but is able to make it invisible.
- 3) Footer, positioned below the chart.

REPORTS

Report ID	Name	Description
2994	Monthly Summary	
2996	Annual Summary	
2990	Evapotranspiration	Angular Gauge: HTML5 Canvas
...

Monthly Summary: Meteo

2014	Velocidad Viento m/s			Humedad Relativa %			Radiacion Solar W/M2		
	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
13	35.00	39.52	51.50	32.31	51.55	60.74	-0.27	78.87	424.76
14	34.10	38.97	49.40	32.87	51.09	62.02	0.01	84.72	392.95
15	0.20	1.27	31.10	39.90	63.60	85.50	0.00	267.10	957.00
16	0.20	0.86	4.80	41.20	62.08	79.60	1.00	202.40	1008.00
17	0.20	0.89	4.70	38.20	62.02	83.70	-1.00	209.58	981.00
18	0.30	0.94	4.90	45.10	65.84	83.70	0.00	175.39	993.00
19	0.30	1.11	4.30	48.50	71.10	93.80	1.00	239.99	1031.00
20	0.20	0.93	4.60	41.80	71.17	96.80	1.00	233.29	960.00
21	0.10	0.91	4.80	41.30	64.63	80.20	1.00	193.99	818.00
22	0.20	0.80	4.80	37.70	60.41	78.10	1.00	197.86	946.00
23	0.30	0.59	1.80	67.10	70.20	74.10	0.00	1.08	2.00
Overall	0.10	10.44	51.50	32.31	62.22	96.80	-3.05	175.84	1210.06

Tags Map Recent Player Charts Reports History Assets Comments

The 'Report'-page is used to show user defined reports.

You can define several reports per location. When creating a new report, YDOC-Insights pops up a list with report templates to choose from. After picking a template YDOC-Insights pops-up (if applicable) a list with tags and you can select which one(s) you want to include in the report. Reports can be printed or saved or e-mailed as Html compatible documents.

The list with templates contains a standard tabular report in html, csv, xls, xml and txt format. The list contains a/o the following instrumentation reports: angular gauge, linear gauge, tank gauge, pie gauge, compass and a traffic light.

The standard report displays the measurement history of the selected tags in tabular form over the selected period.

To define a new report select 'New report' from the 'Edit->Reports' menu or from the menu that pops-up when you click the right mouse button. To edit an existing report, select the report from the 'Reports'-list and select 'Properties' from the 'Edit->Reports' or pop-up menu. To delete an existing report, select the report from the 'Reports'-list and select 'Delete' from the 'Edit->Reports' or pop-up menu. Deleting a 'Report' is also possible by 'dragging' the chart to the 'Deleted Items'-location. Deleted reports are transferred to the 'Deleted Items'-location. To delete reports forever, the reports must be deleted from the 'Deleted Items'-location as well. You can move reports to other locations by 'dragging & dropping'.

Note 1: If you create new reports by cloning it from others (or by cloning a location containing reports), the clones and original report will share their queries and XSLT. If you change a query or the XSLT within a clone or the original, your changes will be applied to all clones and the original as well. You can of course "unshare" a clone from others and the original report as well. An original report shared to by clones can't be permanently deleted and when you try, it will stick in the root of the 'trash can' location.

You can change a report's order in the list by clicking the 'Ctrl' & 'Up arrow' or 'Alt' & 'Down arrow' keys simultaneously.

Defining a report

Parameter	Value	Description
COLORALARM	red	Alarm color (low-low & high-high limit violations)
COLORDISCHARGE	blue	Discharge color
COLORHINT	blue	
COLOROUTLINE	#FFA500	Outline color of tank
COLORRECEIVE	yellow	
COLORREST	green	Status rest color
COLORTEXT	navy	Text color

Note: Knowledge of SQL, HTML, XML and XSLT transformation is required to define custom reports! A good site to start you self education is <http://www.w3schools.com>

A report exists out of XML data, which will be translated to a document by using an XSLT transformation. An XSLT transformation describes how XML data should be transformed into another data format. The power of using XML and XSLT is the possibility to separate the data from the layout of a document. XML contains the document data, while XSLT describes the document layout. To learn more about XML and XSLT consult the web-site of the 'World Wide Web Consortium (W3C)' www.w3c.org. The XML data for a report is constructed from the result of SQL queries (see: chapter 'Defining report queries' and 'XML data').

Instead of building a textual report it's also possible to create graphical reports for instance by making HTML5 Canvas drawings, using Java- or VB-script in an HTML-report. YDOC-Insights comes with a few report templates (a/o a standard HTML report, a Canvas linear gauge, tank, compass, pie, etc..).

If Canvas does not work, it could be that you have installed Internet Explorer 8 or older on your system. HTML5 Canvas requires IE9 at least, unfortunately IE9 is not available for XP or W2000.

Content Type: The content type specifies the type of document that should be generated, a lot of different content types exist, however the only content types that make sense from a YDOC-Insights point of view are XML or flat text based documents (e.g. HTML-pages, CSV files and XML files).

The following content types are most commonly used:

- text/html (HTML pages)
- text/plain (Flat text files)

- c) text/csv (CSV files)
- d) application/vnd.ms-excel (XML based Excel sheets)
- e) application/vnd.openxmlformats-officedocument.wordprocessingml.document (Office Open XML Spread sheet)

Display option: At default a report is displayed to all granted users. However it's possible to show a report to a certain type of granted user, while hiding it from another (See: chapter users).

Note: The option "Passer-by" can be used to display the report (on the Map-page only) if a user has no access rights to the location hosting the report, but is passing by during navigating to under laying sub locations.

Packaged Report: A packaged report is an archive file in ZIP-format containing a collection of XML files (e.g. an Office Open XML document). A packaged report originally created/designed in an external program (e.g. Microsoft Excel 2007), can be imported in YDOC-Insights and YDOC-Insights can update the contents of the packaged report by replacing one of the XML files in the package. The edit box 'File name in package' is used to specify which XML file in the package should be replaced with the result of the performed XSLT translation.

Display report as instrument: A report looking like an instrument (e.g. a temperature gauge) can be displayed on the Map-page. A refresh-rate can be specified to automatically refresh the instrument for instance to display the most recent value. If an instrument report is in HTML format, the instrument can sent action events to the application. To inform the application that the report can initiate actions, the <body> element of the HTML should contain the action="" string attribute. E.g. <body action=""> The action attribute can be set by JavaScript enclosed in the HTML, e.g. triggered by an event after clicking a button. The action attribute is a formatted string that may contain up to three fields separated with semi-colons (;). The first field specifies the type of action: 1=Edit set points, 2=Set tag value and 3=Change location. The second field specifies the ID of the tag or location to perform the action on. The 3 field is optional and can be used to specify the value of a tag to be written to the database. E.g. action="2;1;1.23" will cause the application to log 1.23 for the tag with tagID=1 into the database.

Defining report parameters

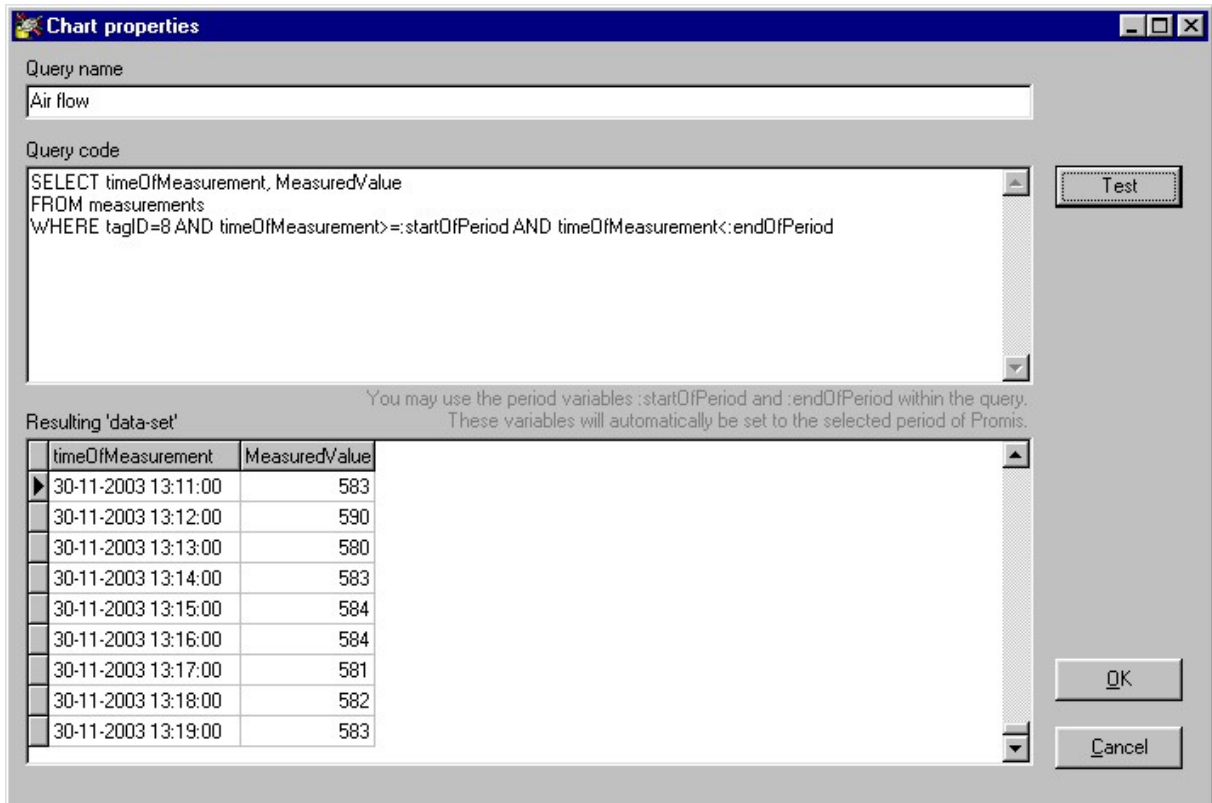
Defining report parameters is not a must, but can be handy. The XML-data of the report is constructed from the result of SQL-queries. Within SQL-queries you could decide to use fixed variables for your search and filter criteria, it could however be handy to use variables instead. Besides using a Parameter as an SQL variable, the parameters are also copied to the XML data, so you can use the Parameters directly in the XSLT transformation as well.

Click the 'Parameters' tab to list all the defined Parameters. Click the 'Add' button to create new Parameters. You may define as much Parameters as required. To modify or delete an existing Parameter, select the Parameter from the list and click the 'Delete' or 'Change'-button.

A Parameter should have a name and a value. The name may only contain alphanumeric tokens and the underscore token (_). The name may not start with a numeric digit. The value can be of type string, integer or floating-point. To use a Parameter within an SQL-query or in the XSLT text, enter its name preceded with a colon token (:). For instance if the name of a Parameter is **x**, then **x** should be referred to in a query as **:x**

Defining report queries

The XML data needed to construct the contents of a report has to be extracted from the database. YDOC-Insights uses SQL queries to extract data from the database. The meaning of a query is to retrieve a list of records from a database, according to defined search criteria. In the context of YDOC-Insights, the result of a query forms a collection of XML data. Consult chapter "XML data" to see how the XML data will look like.



Click the 'SQL' tab to list all the defined SQL queries. Click the 'Add' or 'Clone' button to create new SQL queries. You may define as much queries as required. To modify or delete an existing query, select the query from the list and click the 'Delete' or 'Change'-button.

Query name: Specify a unique name for the query. This name will be used as the name in the XML Dataset. <dataset name="query name">

Query code:

You have to specify a complete 'SQL SELECT' statement. You may use the parameters **:startOfPeriod** and **:endOfPeriod**, to narrow the number of records in the Query to the selected period (To select a period, open the "Period Selector" from the 'Control-menu').

Besides **:startOfPeriod** and **:endOfperiod**, you can also use similar parameters rounded down or up to the nearest discrete time boundaries; **:startDayOfPeriod**, **:startMonthOfPeriod**, **:startYearOfPeriod**, **:endDayOfPeriod**, **:endMonthOfPeriod** and **:endYearOfPeriod**.

Besides time parameters you may use the parameter **:locationID** and any of your own defined Parameters (see: previous chapter).

A simple query could look as follows:

```
SELECT timeOfMeasurement, MeasuredValue FROM Measurements WHERE  
tagID=8 AND timeOfMeasurement>=:startOfPeriod AND  
timeOfMeasurement<:endOfPeriod
```


This query retrieves the measurements of the tag with TAGID=8 over the selected period. The list returns a table with two columns (timeOfMeasurements and MeasuredValue). **Note:** MeasuredValue is returned in the default unit of the parameter associated with the tag.

The XML `<dataset>` contains a list with column names. In this case the list will be: `<col name="timeOfMeasurement"/> <col name="Measuredvalue"/>`

The XML `<dataset>` contains a list of rows, which equals the number of records returned by the SQL query. Each `<row>` contains a list of values that equals the number of columns returned by the SQL query. The XML tag for a column equals the name of the SQL column. In this case `<timeOfMeasurement>timestamp</timeOfMeasurement>` and `<MeasuredValue>value<MeasuredValue>`

When creating a "new"-report YDOC-Insights generates a report with default queries. Each query results in a summary over the selected period for one of the tags of the concerned location.

A default query looks as follows:

```
SELECT Count(*) as Cnt, Min(MeasuredValue) as MinVal , Max(MeasuredValue) as MaxValue, Avg(MeasuredValue) as AvgVal FROM measurements WHERE measurements.tagID=8 AND timeOfMeasurement>=:startOfPeriod AND timeOfMeasurement<:endOfPeriod
```

The "measurements"-table has three fields:

TagID, TimeOfMeasurement and MeasuredValue

XML Data

Click the 'XML Preview' tab to see the XML data generated from your SQL queries.

The XML data generated by YDOC-Insights exists out of several nested levels, the levels from outer to inner are:

`<report name="report name">` giving the name of the report, location and selected period.

`<params>` this section contains a list of `<param>` sections. *One <param> for every defined Parameter.*

`<param name="parameter name">` this section contains the name and the value of a defined Parameter.

`<datasets>` this section contains a list of `<dataset>` sections. Each SQL query results in a separate `<dataset>`

`<dataset name="query name">` this section contains a list of columns equal to the number of columns returned by the SQL query and it contains a list of rows equal to the number of records returned by the SQL query.

`<col name="col name">` a `<col>` does not contain any data, it just specifies the name of a column as returned by the SQL query.

`<row>` this section contains the field values for a specific record as returned by the SQL query.

`<col name>value</col name>` the name between `<>` is set to the SQL column name of the concerned value.

XML example:

```
<?xml version="1.0"?>
<report name="Example report" width="120" height="240">
  <startofperiod>2008-01-12T00:00:00</startofperiod>
  <endofperiod>2008-01-13T2:00:00:00</endofperiod>
  <location>Compressor</location>
  <locationpath>Location A - Site 1 - Floor 1</locationpath>
  <params>
    <param name="parX">100</param>
    <param name="parY">Some text</param>
  </params>
  <datasets>
    <dataset name="Air flow">
      <col name="Cnt"/>
      <col name="MinVal"/>
      <col name="MaxVal"/>
      <col name="AvgVal"/>
      <row>
        <Cnt>615</Cnt>
        <MinVal>517</MinVal>
        <MaxVal>798</MaxVal>
        <AvgVal>586.484</AvgVal>
      </row>
    </dataset>
  </datasets>
</report>
```

XSLT Transformation

If you use the report templates of YDOC-Insights, you probably don't have to worry about XSLT transformations. But if you want to create your own reports you might need knowledge about XSLT transformations. It is possible to define very complex transformations, so it's possible to create very advanced reports. YDOC-Insights makes use of the Microsoft MSXML component, which even allows to incorporated scripting (JavaScript en VB-Script) in your transformations. The output format of a report can be flat-text (e.g. csv) or XML-based (like HTML).

To learn more about XSLT transformations consult the web-site of the 'World Wide Web Consortium (W3C)' www.w3c.org.

Note: When implementing an HTML report you can include chart's into it as well. To include charts add HTML img-elements (in lower-case) to the HTML code as follows: ``, where x is the ID of the chart to be included.

A simple XSLT transformation example to list the raw result of your SQL-queries:

```
<?xml version="1.0"?>
<xsl:stylesheet xmlns:xsl = "http://www.w3.org/1999/XSL/Transform" version = "1.0" >
<xsl:output method="html" omit-xml-declaration="yes" media-type="text/html"/>
<xsl:template match="/report">
<html>
  <style>
    body {font-family: Arial; font-size:12pt; color:black;}
    table {font-family: Arial; font-size:8pt; color:black;}
    h1    {font-family: Arial; font-size:16pt; font-weight:bold; color:black}
  </style>
  <body>
    <h1><xsl:value-of select="@name" /></h1>
    <table>
      <tr>
        <td><b>Location:</b></td><td><xsl:value-of select="location" />,
          <xsl:value-of select="locationpath" /></td>
      </tr><tr>
        <td><b>Start of period:</b></td>
        <td><xsl:value-of select="startofperiod" /></td>
      </tr><tr>
        <td><b>End of period:</b></td>
        <td><xsl:value-of select="endofperiod" /></td>
      </tr>
    </table>
    <xsl:for-each select="datasets/dataset">
      <br/><b><xsl:value-of select="@name" /></b><br/>
      <table>
        <tr>
          <xsl:for-each select="col">
            <td><b> <xsl:value-of select="@name" /></b></td>
          </xsl:for-each>
        </tr>
        <xsl:for-each select="row">
          <tr>
            <xsl:for-each select="node()">
              <td><xsl:value-of select="." /></td>
            </xsl:for-each>
          </tr>
        </xsl:for-each>
      </table>
    </xsl:for-each>
  </body>
</html>
</xsl:template>
</xsl:stylesheet>
```

Defining a report schedule

YDOC-Insights has an optional module to schedule automatic report deliveries.

Click the 'Schedule' tab to define a delivery schedule.

The screenshot shows the 'Report properties' dialog box with the 'Schedule' tab selected. The 'Report name' is 'Example Report'. The 'International data format' checkbox is checked. The 'Schedule automatic report deliveries' checkbox is also checked. The 'Timing' section shows the start time as 'zaterdag 19 november 2005' at '00:00:00', a duration of '1' 'day(s)', and the next delivery scheduled at 'zondag 20 november 2005' at '00:00:00'. The 'Report file name format' section shows a prefix of 'test', a date/time part of 'ddmmyyyy', a trail of '.htm', and a file name of 'test2011.2005.htm'. The 'Deliver report at' section shows a host of 'S4ALL' and an email address of 'support@projex.nl'. Buttons for 'Refresh', 'Import...', 'Export...', 'OK', and 'Cancel' are visible on the right side of the dialog.

Reports can be delivered to several Host types and in several formats (e.g. CSV, HTML, Excel). The different supported Host types to delivery reports at are:

1. Local File System (storing report files on disk)
2. SMTP-Server (e-mail reports)
3. FTP-Server (store report files on a remote file)
4. HTTP-Server (post reports to a HTTP-Server/Web-Service)

From the 'Edit'-menu you can pop-up the "Report Hosts" editor to define the Hosts to be used for automatic report delivery.

Timing

Start time, the 'Start time' defines the beginning of the period you want to report about. After every successful delivery the 'Start time' time is shifted with the 'Duration' of the report period.

Delivery time, the 'Delivery time' defines when a report should be delivered. After every successful delivery the 'Delivery time' time is shifted with the 'Duration' of the report period. Normally, the 'Delivery time' should be a time later then 'End time' of the period you want to report about. (Delivery time > (Start time + Duration)).

Report file name format

The file name of a report file to be delivered may start with a certain prefix and end with a certain trail. The part between prefix and trail can be formatted based on the 'Delivery time'.

The Date/Time part format string is composed from specifiers that represent values to be inserted into the formatted string. Some specifiers (such as "d"), simply format numbers or strings. Other specifiers (such as "/"") refer to locale-specific strings from global variables.

In the following table, specifiers are given in lower case. Case is ignored in format specifiers.

Specifier	Displays
d	Displays the day as a number without a leading zero (1-31).
dd	Displays the day as a number with a leading zero (01-31).
ddd	Displays the day as an abbreviation (Sun-Sat) using the strings given by the ShortDayNames global variable.
dddd	Displays the day as a full name (Sunday-Saturday) using the strings given by the LongDayNames global variable.
m	Displays the month as a number without a leading zero (1-12). If the m specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mm	Displays the month as a number with a leading zero (01-12). If the mm specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mmm	Displays the month as an abbreviation (Jan-Dec) using the strings given by the ShortMonthNames global variable.
mmmm	Displays the month as a full name (January-December) using the strings given by the LongMonthNames global variable.
yy	Displays the year as a two-digit number (00-99).
yyyy	Displays the year as a four-digit number (0000-9999).
h	Displays the hour without a leading zero (0-23).
hh	Displays the hour with a leading zero (00-23).
n	Displays the minute without a leading zero (0-59).
nn	Displays the minute with a leading zero (00-59).
s	Displays the second without a leading zero (0-59).
ss	Displays the second with a leading zero (00-59).
/	Displays the date separator character given by the DateSeparator global variable.
:	Displays the time separator character given by the TimeSeparator global variable.
'xx'/"xx"	Characters enclosed in single or double quotes are displayed as-is, and do not affect formatting.

Starting the Report Scheduler

To enable the Report Scheduler select 'Start Report Scheduler' from the 'Control'-menu. You need a 'Report Scheduler' license to be able to start the 'Report Scheduler'.

The 'Report Scheduler' is a service that will run in the background and keeps running even if you close YDOC-Insights, and will start running after a re-boot automatically. To stop the 'Report Scheduler' select 'Stop Report Scheduler' from the 'Control'-menu.

Use GoogleMaps to display and track locations

YDOC-Insights comes with several report templates to visualize or report your data. The *GoogleMaps.prd* template can be used to display your locations as markers on GoogleMaps. When the report is included in a location and the location has a latitude and longitude, the last known position along with its logged tracking trail will be displayed on the map. If the location has sub-locations, the last known positions of all sub-locations with a latitude and longitude tag will be displayed on the map as well (without their tracking trails). If a location has a heading tag, the position marker will be displayed as an arrow pointing in the direction of the heading. If quality parameters (e.g. turbidity) are assigned to the sub-locations, the color of the position markers will be displayed in yellow for a high or low limit violation and red in case of a high-high or low-low limit violation. A marker will blink red in case one of the quality parameters of a particular sub-location has



aged out.

The report has a/o the following parameters:

- a) MAPTYPE, 0 to display a roadmap or 1 to display a satellite view.
- b) ZOOM, the GoogleMaps zoom factor or 0 to use automatic zoom.
- c) TRACKINGENABLED, 0 to hide tracking or 1 to show (if tracking positions are logged).
- d) TAGCODE0xx, Tag codes of the quality parameters to be checked for limit violations.
- e) INTERVAL, if set tag values will be displayed with INTERVAL seconds in between.
- f) TIMEOUT, the maximum allowed age of a quality parameter in seconds. 0= infinite.

ATTENTION

- GoogleMaps requires Internet access.

HISTORY

The 'History'-page shows the measurements, over the select period of the tags associated to the selected location, in tabular form.

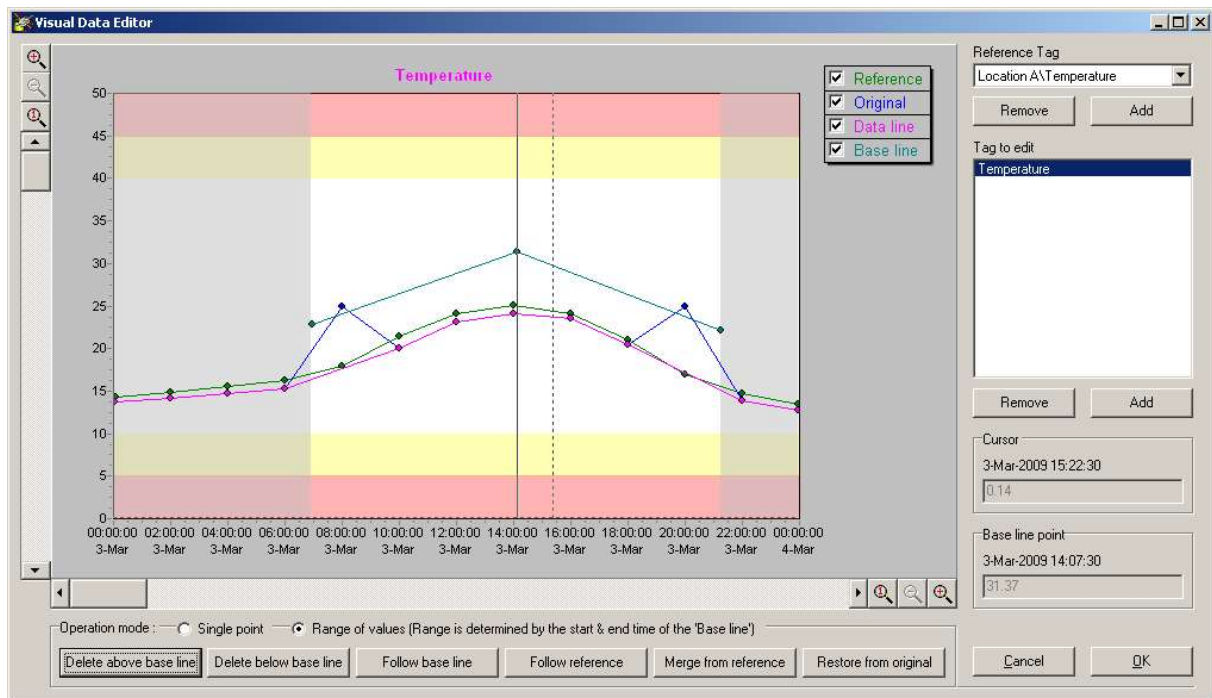
TimeStamp	Air flow	Air Pressure	Air temperature
	m³/h	Bar	°C
1-dec-2003 01:51:00	583,00	8,90	72,50
1-dec-2003 01:52:00	594,00	8,90	72,60
1-dec-2003 01:53:00	590,00	8,90	72,70
1-dec-2003 01:54:00	551,00	8,90	72,40
1-dec-2003 01:55:00	550,00	8,90	72,20
1-dec-2003 01:56:00	564,00	8,90	72,20
1-dec-2003 01:57:00	565,00	8,90	72,30
1-dec-2003 01:58:00	570,00	8,90	72,40
1-dec-2003 01:59:00	567,00	8,90	72,40
1-dec-2003 02:00:00	549,00	8,90	72,40
1-dec-2003 02:01:00	526,00	8,90	72,20
1-dec-2003 02:02:00	544,00	8,90	72,00

This sheet can be printed, saved or e-mailed.

Visual Data Editor

Mostly the measurement data stored in the database is automatically collected without any human intervention. It could however, that those measurements are not what they supposed to be, because of equipment malfunctioning or any other exceptional reason. The 'Visual Data Editor' can be used to manually correct your measurements quick and easily in a graphical manner.

Each location has its own 'Editor'. To pop-up the 'Editor', select a location from the 'Location'-list and select 'Visual Data Editor' from the 'Edit->Locations' or pop-up menu. To edit data, administrator or supervisor rights are required.



Before you can edit measurements of a tag you have to select the tag from the 'Tag to edit' list. When a tag is selected the originally collected data will be displayed as a blue line and the modified/current measurements as a purple line (the data line). Only the data points of the data line can be modified. When you are done modifying/verifying a tag and want to continue to the next, you can either select the next tag with your mouse or by clicking the 'Alt' & 'Down arrow' keys simultaneously or 'All' & 'Up arrow' for the previous one.

You can add tags to the list by clicking the corresponding 'Add'-button. It's possible to add tags from other locations to the list as well.

To compare the measurements of the tag you want to edit/verify with measurements of a similar tag, you can select a tag from the 'Reference tag' list. The data of the reference tag will be displayed as a green line. You can add a tag to the reference list by clicking the corresponding 'Add'-button. It's possible to add tags from other locations to the list as well.

Only 'Administrators' are allowed to add/remove tags to/from the lists.

Note: Modifications are not posted to the database immediately. If modifications are made, a confirmation question, asking if you want to save your changes, will be raised when closing the 'Editor'.

Single point mode

Data points are displayed as small dots, to change the value of a data point, select the data point with your mouse, click and hold the left mouse button while dragging the data point to the wished value. Data points can be dragged vertically only.

To select an individual data point, move the mouse cursor near the data point until it is snapped by the vertical solid hairline (The 'Data line point' box at the right bottom site of the chart, will display its timestamp and value). You can also select the next data point by clicking the 'Alt' & 'Right arrow' simultaneously or 'Alt' & 'Left arrow' for the previous one.

When a data point is snapped by the vertical hairline, you can delete the data point by clicking the 'Ctrl' & 'Del' keys simultaneously.

You can manually add data points, by moving your mouse to the wished X, Y position (time, value) in the chart window followed by clicking the left mouse button or 'Ins' key while holding the 'Shift' key.

Range of values mode

If multiple points have to be modified, dragging single data points to their wished values can be time consuming. In 'Range of values' mode you can specify a certain range (period of time) on which you want to perform your modification operations. The range on which a modification operation is performed is determined by the so-called 'Base line'. You can add 'Anchor point' to the 'Base line', by moving your mouse to the wished X, Y position (time, value) in the chart window followed by clicking the left mouse button or 'Ins' key while holding the 'Shift' key.

When an 'Anchor point' is snapped by the vertical hairline, you can delete the 'Anchor point' by clicking the 'Ctrl' & 'Del' keys simultaneously.

The range on which a modification operation is performed, is the time between the 'Anchor point' with the youngest timestamp and the one with the oldest, but must be within the visible part of the charts X-axis (time-axis).

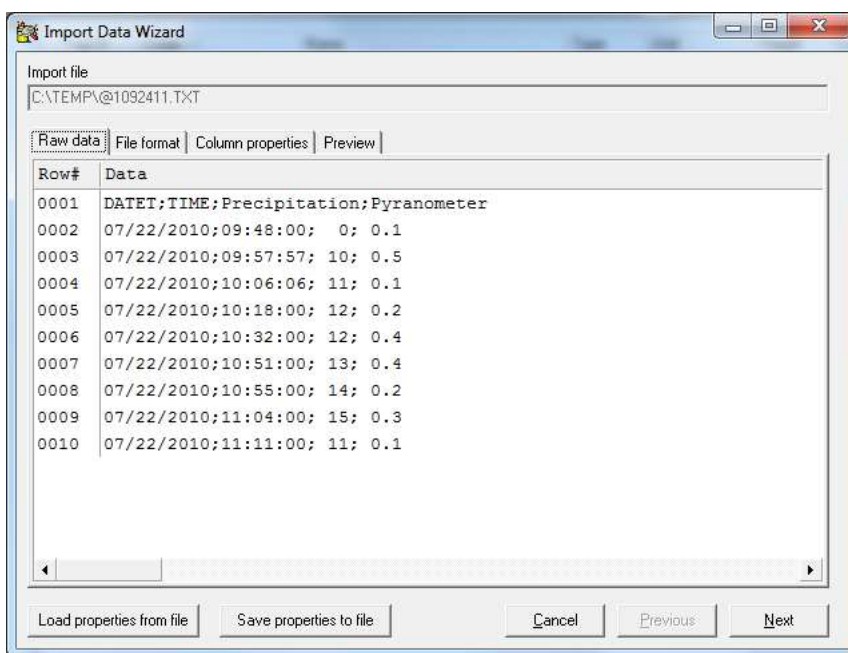
The following 6 operations are possible:

1. **Delete above base line**, data points above the base line will be deleted.
2. **Delete below base line**, data points below the base line will be deleted.
3. **Follow base line**, the value of a data point will be set to the interpolated value between the two nearest surrounding anchor points, so the data line will follow the base line.
4. **Follow reference line**, the value of a data point will be set to the interpolated value between the two nearest surrounding reference points, so the data line will follow the reference line.
5. **Merge from reference**, the data line will be extended with points from the reference line, with timestamps not existing in the data line
6. **Restore from original**, all existing data points will be deleted and replaced by the original collected data points

Data Import Wizard

Mostly the measurement data stored in the database is automatically collected without any human intervention. It could however, because of equipment malfunctioning or any other exceptional reason, that you have to import measurements from text files. The 'Data Import Wizard' can be used to manually import measurements from tabular oriented text files (like CSV files). The files should contain <line feed> or <carriage return> terminated rows and each row should contain an equal number of columns, with (a) date/time column(s) and separated columns for each individual measurement parameter. In example a separated column for 'Temperature' and 'Level'.

Each location has its own 'Import Wizard'. To pop-up the 'Wizard', select a location from the 'Location'-list and select 'Data Import Wizard' from the 'Edit->Locations' or pop-up menu. To import data, administrator or supervisor rights are required. The import properties are saved after a successfully completed import, so you don't have to specify them again for a next import.



After selecting a file to import the "Wizard" pops-up and will show the contents on the 'Raw data'-page. Please study the contents of this page first, its needed to be able to configure the correct import properties.

A file may start with one or more header rows, giving info about the process generated the file and/or describing the columns in the file.

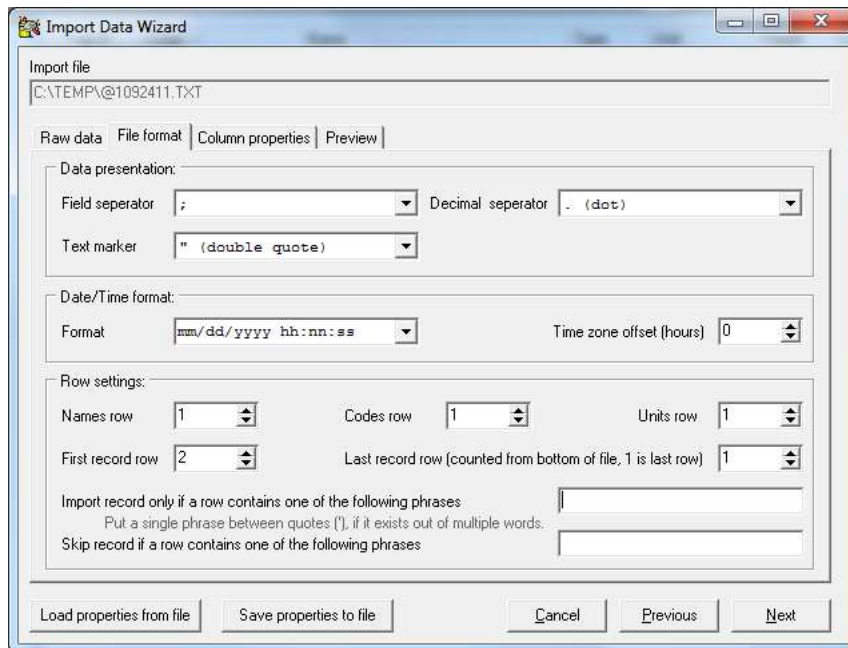
Columns in a file can be separated by each other by means of a separation token (e.g. a ; or space) or starting at fixed character positions.

Please study the date/time format as well. A lot of different notations exists (e.g. d/m/y h:n:s or mmdyyhhnss or yyyy/mm/dd hh.nn)

Verify also which character is used for the decimal separator.

When done, click the 'Next'-button to go to the 'File format'-page.

File format



Data presentation

Specify the 'Field separator', the character that is used to separated the different columns in the file or choose 'Fixed positions' if the columns are starting at fixed positions.

Specify the character that is used for the 'Decimal separator' in floating point numbers.

The 'Wizard' can be used to import numbers only, but it could be that the file contains text columns as well. Text columns are normally (because they could contain tokens equal to the 'Field separator') enclosed between 'Text markers'. Please specify which ` character is used as the 'Text marker'.

Date/Time format

Timestamps can be notated in several formats, please pick a matching format from the list or edit one yourself. Use the following characters for the date part y (year), m (month), d (day) and use the following characters for the time part h (hour), n (minute), s (second).

You can specify a 'Time zone offset' in hours, in case the timestamps in the file are not matching your time zone. This offset is added to the imported timestamps.

Row settings

A file may start with one or more header rows giving info about the process generated the file and/or describing the columns in the file.

- 1) Names row, a row specifying a name for each column. Set to 0 if such a row does not exist.
- 2) Codes row, a row specifying a code for each column. Set to 0 if such a row does not exist.
- 3) Units row, a row specifying a unit for each columns. Set to 0 if such a row does not exist.
- 4) First record row, the row in the file where the first data record starts.
- 5) Last record row, a file may contain one or more footer rows giving info about the process generated the file. To avoid import failures, specify where the last record row occurs counted from the bottom of the file.

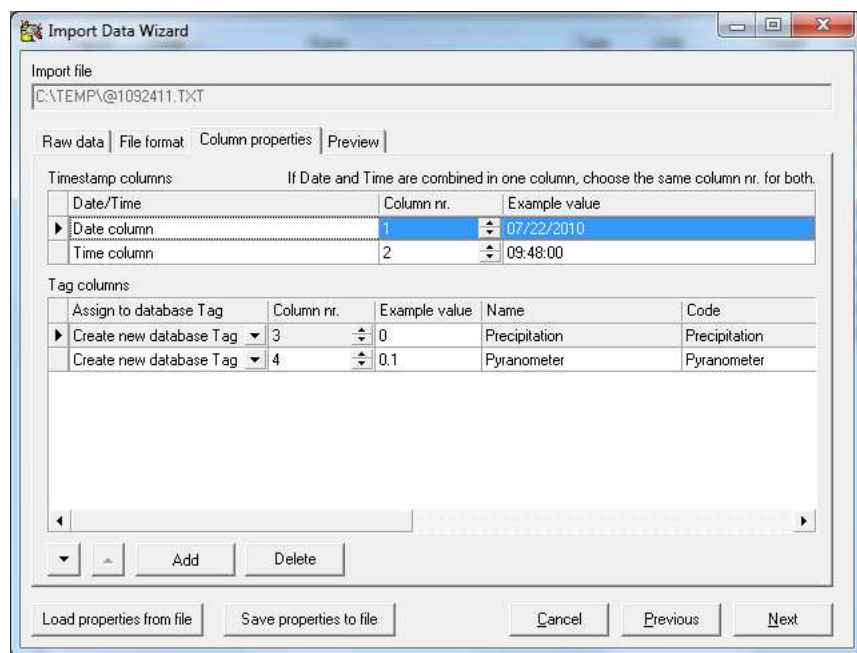
A file may contain several informational rows (not part of the header or footer rows), which are not containing valid importable record data. To avoid import failures while trying to import such rows, filters can be specified to include or exclude those rows. A row is included if it contains at least one of the "include phrases" (leave blank if all records should be included). A row is excluded if it contains any of the "Exclude phrases" (leave blank if none of the records should be excluded). Phrases are separated by each other with spaces. If a phrase exits out of multiple words, the phrase should be enclosed between single quotes.

When done, click the 'Next'-button to go to the 'Column properties'-page.

Column properties

The 'column properties'-page is used to specify which columns from the file you want to import.

A file may contain several columns, but only a few of them could be interesting for importing.



Timestamp columns

Each record to import should have a timestamp specifying the time at which the values in the row are acquired, measured or recorded. Please specify which column is used for the date-part and which for the time-part. If the data- and time-parts are combined in one column, then please specify the same column for both of them. The example value (taken from the first record row) should show a valid date or time value.

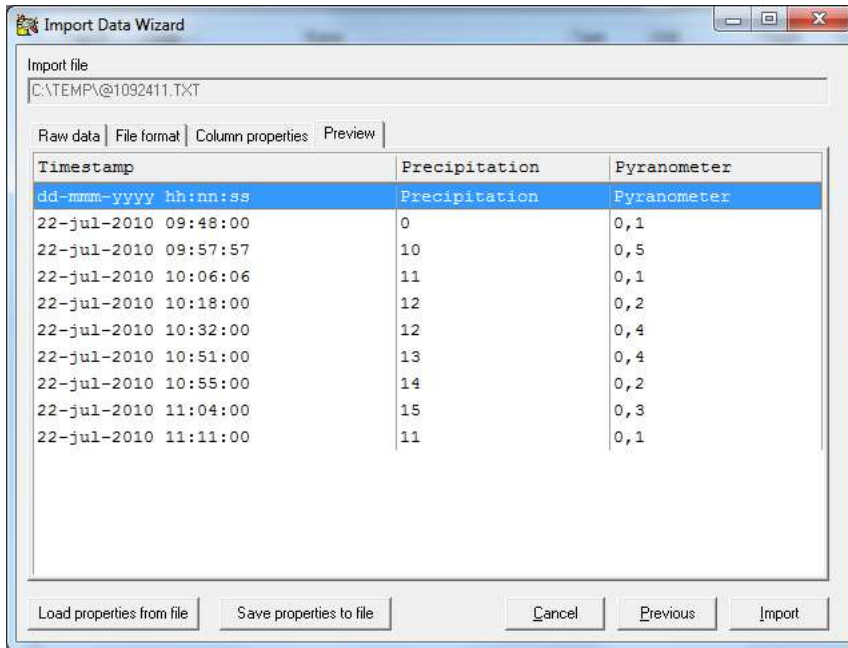
Tag columns

To be able to import the data of a column, the column must be assigned to a 'Tag' in the database. You can select a corresponding tag from a list listing all the tags of the particular location. If a corresponding tag is not in the list the 'Wizard' can create one for you during import, the new tag will be created with the 'Name', 'Code' and 'Unit' as specified by you or taken from the import header rows. When specified the right column, the 'example value' should show an 'expected' value from the first record row.

NOTE: It might be that the values in the import file are not in the expected engineering values matching the corresponding tag. You can specify a factor, offset and conversion table to convert the raw device values to expected engineering units. If you select an existing tag from the database, the factor, offset and conversion table settings will be copied from the corresponding tag. If however the values in the file are already in the expected engineering units set factor to 1, offset to 0 and conversion table to 'none'.

When done, click the 'Next'-button to go to the 'Preview'-page.

Preview & Import



After specifying the correct import properties, the 'Preview page' should display a tabular preview of the selected data you want to import. If the 'Preview page' appears without any errors and you have verified that the data is matching your expectations, you can start the actual import process by clicking the 'Import'-button. Importing can take a few minutes depending of the amount of data to be imported.

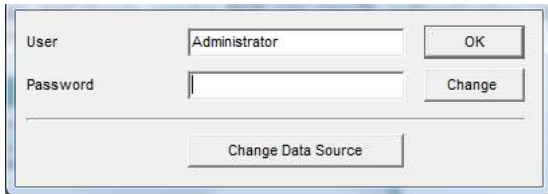
DATABASE

YDOC-Insights deploys an open database (ADO/OLEDB) to store its data. The default database as automatically installed with the setup is an Ms-Access database

(C:\ YDOC\ydocinsights\database\ydocinsights.mdb).

However It's also possible to use an SQL-Server, Azure SQL or Oracle database.

To use a licensed Oracle or SQL-Server database, you have to ask your DBA (Database administrator) to create an empty database. YDOC-Insights itself will create the necessary tables.



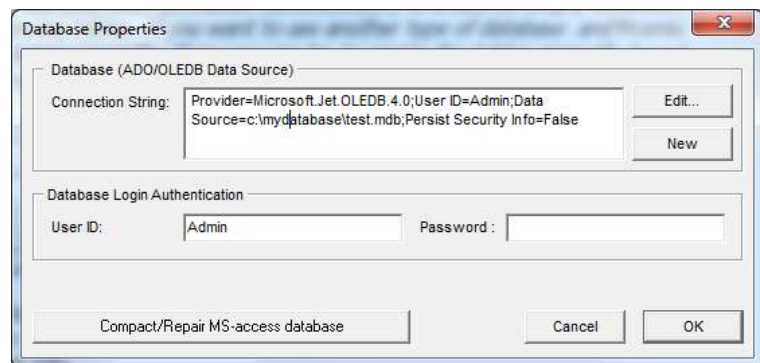
When clicking the 'Change Data Source'-button in the YDOC-Insights Login screen you can change the database (Data Source) used by YDOC-Insights.

A Data Source can be specified by its ADO (Microsoft Acces Data Objects) connection string. Database systems like SQL-Server require that you specify authentication info to get access to the database. Please ask your DBA for the right info.

Click the 'Edit...'-button to Edit the existing connection string within a configuration window of the according provider.

Click the 'New"-button if you want to choose another type of database provider.

ADO Connection string examples:



Ms-Access (Microsoft Jet 4.0 OLE DB Provider):

```
Provider=Microsoft.Jet.OLEDB.4.0;Data Source=c:\ YDOC\ydocinsights\database\ydocinsights.mdb;
```

In case your MS-access file got too big or corrupted, you can try to compact/repair it by clicking the 'Compact/Repair'-button.

SQL-Server (Microsof OLE DB Provider for SQL Server):

```
Provider=sqloledb;Data Source=<Server>;Initial Catalog=<Database>;
```

SQL-Server (SQL Native Client, preferred if installed on your system):

```
Provider=SQLNCLI.1;Data Source=<Server>;Initial Catalog=<Database>;
```

Azure SQL (SQL Native Client):

```
Provider=SQLNCLI.1;User ID=<login name>@<server name>;Initial Catalog=<Database>;Data Source=<server name>.database.windows.net,1433;
```

Oracle 11g Express (Oracle Provider for OLEDB):

```
Provider=OraOLEDB.Oracle.1;Persist Security Info=False;User ID=ydocinsights;Data Source=<Server>:1521/x
```

Oracle 11g (Oracle Provider for OLEDB):

```
Provider=OraOLEDB.Oracle.1;Persist Security Info=False;User ID=ydocinsights;Data Source=<Database>
```

Where <Server> is the IP address or name of the computer running the database server,
<Database> the name of the SQL-server database or Oracle TNS.

MS-Access

When using Ms-Access, the physical database size is limited to 2GB and therefore the maximum number of measurement records that can be stored is approximately 45 million. When logging only one tag with a frequency of 1 measurement per minute, you will be capable to log for 85 years, before the database reaches its limits. This looks long, but if you log 85 tags once per minute, the database will reach its limits within 1 year. To avoid these limitations a licensed database server should be used (e.g. SQL-Server 2012 Web Edition or Oracle 11g Standard Edition).

To prevent your database from overloading you can:

- 1) Regularly backup the database (see: chapter Database backup) and delete old data in order to create space for future records.
- 2) Specify in the 'conversion & logging'-properties of a tag, that you automatically want to delete the measurement records of the concerned tag if they are older than a certain amount of days.

Note: Ms-Access can't reach the 45 million measurements record limit without regular database maintenance as Ms-access does not free temporarily used disk space and is vulnerable for unexpected power outages as well. You should perform a "Compact/Repair database" at a regular bases to reclaim unused disk space or to try to recover from odd database behavior.

SQL-Server

When using SQL-Server Express, the physical database size is limited to 10GB and therefore the maximum number of measurement records that can be stored is approximately 120 million. When logging only one tag with a frequency of 1 measurement per minute, you will be capable to log for 225 years, before the database reaches its limits. This looks long, but if you log 225 tags once per minute, the database will reach its limits within 1 year. To avoid these limitations a licensed SQL-Server database server should be used (e.g. SQL-Server 2012 Web Edition).

To prevent your database from overloading you can:

- 1) Regularly backup the database (see: chapter Database backup) and delete old data in order to create space for future records.
- 2) Specify in the 'conversion & logging'-properties of a tag, that you automatically want to delete the measurement records of the concerned tag if they are older than a certain amount of days.

Installing SQL-Server Express

1. From microsoft.com download and install "SQL-Server Express with tools". When asked for during installation choose Express and not LocalDB.
2. Start the 'SQL Server Management Studio', connect to your local database engine (<computer name>\SQLEXPRESS) using 'Windows Authentication'.
3. In the 'Object Explorer' right mouse click 'Databases' and click 'New database' and give the database a name (e.g. YOURDATABASE).
4. In the 'Object Explorer' right mouse click 'Databases->Logins->sa' and click 'Properties'.
5. Select the 'General'-page, choose 'SQL-server Authentication' and specify a password for the 'sa' login (e.g. yourPassword)
6. Select the 'Status'-page, enable the login and grant it connect permission.
7. Start YDOC-Insights and change the data source connection string to:

```
Provider=SQLNCLI11.1;Integrated Security=;Persist Security Info=False;User ID=sa;Initial Catalog=YOURDATABASE;DataSource=.\SQLEXPRESS;
```
8. Specify as database credentials, User: sa and Password: yourPassword

Oracle 11g

When using Oracle 11g Express, the physical database size is limited to 11GB and therefore the maximum number of measurement records that can be stored is approximately 125 million. When logging only one tag with a frequency of 1 measurement per minute, you will be capable to log for 235 years, before the database reaches its limits. This looks long, but if you log 235 tags once per minute, the database will reach its limits within 1 year. To avoid these limitations a licensed Oracle database server should be used (e.g. Oracle 11g Standard Edition).

To prevent your database from overloading you can:

- 1) Regularly clean up the database (File menu->Database->Clean up) by deleting old data in order to create space for future records.
- 2) Specify in the 'conversion & logging'-properties of a tag, that you automatically want to delete the measurement records of the concerned tag if they are older than a certain amount of days.

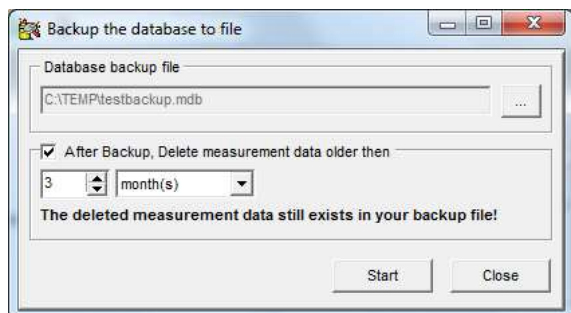
Installing Oracle 11g Express

1. From Oracle.com download and install "Oracle 11g Express". During installation you are asked to specify a password for the 'SYSTEM' account. Please note and don't forget it. For now we assume the password is [yourPassword](#).
2. From Oracle.com download the "32-bit Client Software" as well and install the "Oracle OLEDB driver".
3. Start the Oracle SQL command prompt:
`C:\oraclexe\app\oracle\product\11.2.0\server\bin\sqlplus.exe /nolog`
4. Login to Oracle
`SQL>CONNECT SYSTEM as SYSDBA;`
5. Enter your SYSTEM password: [yourPassword](#)
6. Create a user for the ydocinsights database
`SQL>CREATE USER ydocinsights IDENTIFIED BY yourPassword DEFAULT TABLESPACE USERS;`
7. **Note:** The term "DEFAULT TABLESPACE USERS" is very important, otherwise all your data will be stored in the "TABLESPACE SYSTEM", which has limited space causing your database to bloat after 3 million measurement records.
8. Grant rights to the user
`SQL>GRANT CONNECT, RESOURCE TO ydocinsights;`
9. Optional steps to prepare Oracle Express to allow online backup (backup while the database is in use)
 - a. `SQL>SHUTDOWN IMMEDIATE;`
 - b. `SQL>STARTUP MOUNT;`
 - c. `SQL>ALTER DATABASE ARCHIVELOG;`
 - d. `SQL>ALTER DATABASE OPEN;`
 - e. `SQL>ALTER SYSTEM SET DB_RECOVERY_FILE_DEST_SIZE = 16G;`
10. Start YDOC-Insights and change the data source connection string to:
`Provider=OraOLEDB.Oracle.1;Persist Security Info=False;User ID=ydocinsights;Data Source=localhost:1521/x;`
11. Specify as database credentials, User: ydocinsights and Password: [yourPassword](#)

Database backup

In case you don't make use of a sophisticated database server with features like database mirroring and automated backups, it is recommend to regularly backup the database manually or automatically (see Chapter Backup Service).

To backup your database manually select the 'backup' option from the YDOC-Insights 'File'-menu.



Ms-Access: You can back up the database to or restore from ms-access files (*.mdb).

SQL-Server: You can back up the database to SQL-server backup files (*.bak) and restore from SQL-server backup files as well as ms-access files. The purpose of restoring from ms-access files is to setup your initial database from an ms-access template database.

Oracle: You can't backup or restore your database from Oracle backup files, please use the backup/restore tools that comes with Oracle. You can however setup your initial database by restoring from an ms-access template database.

Attention 1: When backing up, the entire backup database will be cleared and all existing data, tables and indices will be erased. After a successful backup, the backup database will be an exact copy of the original database. When using the default backup database you can copy the ydocinsightsbackup.mdb file to where ever you like in order to archive consecutive backups. If you want to consult the data of an old backup, you could install a free version of YDOC-Insights on another system and Restore the backup on that system.

Attention 2: To avoid that your database will reach its physical size limit, you can specify that data older then a certain time (e.g. 1 month, 2 years, etc...) should be deleted after a successful completion of the backup operation. When using Ms-Access you should perform a "Compact/Repair" afterwards to let Ms-Access free unused physical disk space.

Database structure

The database exists out a lot of table of which most are meant for visualization and organization of the data. Normally a database administrator (DBA) does not have to bother about this structure as it is maintained by YDOC-Insights itself. In case of a corporate database server, all the DBA has to do is create and empty database and assign a database user with full rights to YDOC-Insights.

Filling the database is performed by YDOC-Insights data collectors, which are aware of the database structure. Filling the database with non YDOC-Insights data collectors is possible but not advised as they could cause corruption of the internal organization.

Reading historical data from the database is easy as all collected measurements are stored in just one table, named: "measurements".

The "measurements" table contains records with just three fields:

1. **TAGID**, an integer identifying the ID of the tag of a recorded value.
2. **TIMEOFMEASUREMENT**, a date/time value specifying the time at which a value is recorded by the data acquisition source.
3. **MEASUREDVALUE**, a floating point value representing the value recorded by the data acquisition source at the given TIMEOFMEASUREMENT.

Information about what is measured and where measurements are taking place is stored in the tables "tags" and "locations".

A location specifies where measurements are taking place. The "locations" table contains records with multiple fields, but just three of them are of interest when reading historical data.

1. **LOCID**, an integer value to uniquely identify each location, this ID is automatically generated by YDOC-Insights or its data collectors at initial creation of the location.
2. **LOCNAME**, a user defined readable string representing the name of the location
3. **LOCCODE**, a user defined string to uniquely identify a location by the users own codification (e.g. TANK_001, FRIDGE_005, etc.) Not all locations have to host measurements as some of them can be meant for (hierarchical)organization only. To make querying for locations of interest easy, you could agree that the LOCCODE of all locations hosting actual measurements are starting with a certain prefix (e.g. TANK_).

A tag specifies what is measured (e.g. temperature, flow, etc.). The "tags" table contains records with a lot of fields, but just a few of them are of interest when reading historical data.

1. **LOCID**, an integer value to identify the location where the measurements are taking place.
2. **TAGID**, an integer value to uniquely identify each individual tag, this ID is automatically generated by YDOC-Insights or its data collectors at initial creation of the tag.
3. **TAGNAME**, a user defined readable string representing what you are measuring (e.g. Temperature)
4. **TAGCODE**, a user defined code to specify what is measured (e.g. TEMP_C, VOLUME_M3, etc.) To make querying for tags of interest easy, you could agree upon a certain codification (e.g. TEMP_C for Temperature in °C)
5. **MINRANGE, MAXRANGE**, floating points giving the minimum and maximum range of the measured values (e.g. -30 to +70°C)
6. **LOLIM, LOLOLIM, HILIM, HIHILIM**, floating points giving the low(-low) and high(-high) limits of the measured values.

Example query, a query to get all temperature (TEMP_C) readings from all refrigerators (FRIDGE_) between Aug-12-2013 10:00 and 11:00, could look like:

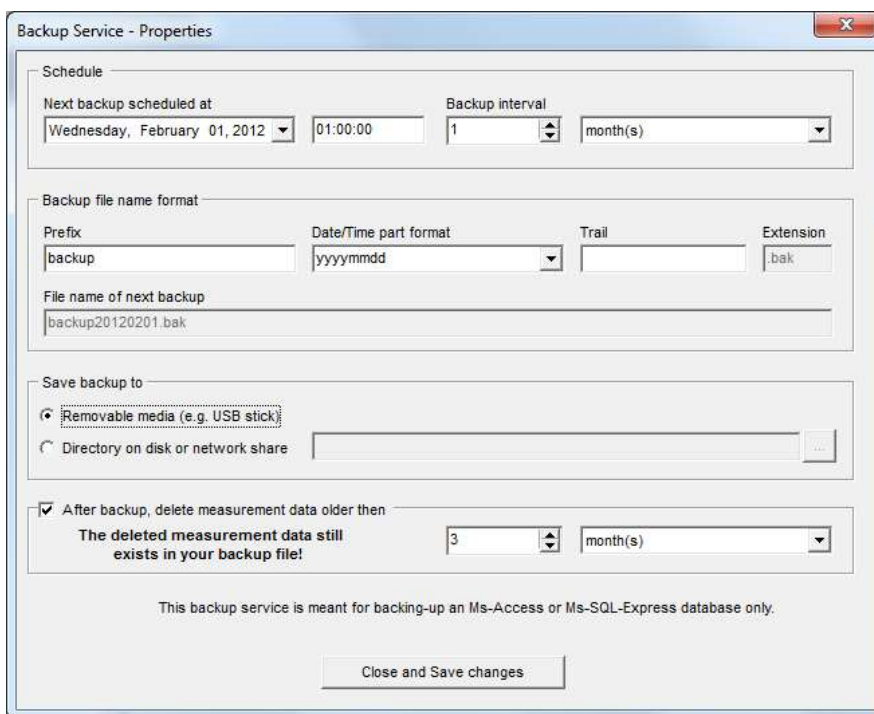
```
SELECT LOCCODE, TAGCODE, TIMEOFMEASUREMENT, MEASUREDVALUE
FROM MEASUREMENTS, TAGS, LOCATIONS
WHERE
LOCATIONS.LOCCODE like 'FRIDGE_%' AND
TAG.LOCID=LOCATIONS.LOCID AND TAGS.TAGCODE='TEMP_C' AND
MEASUREMENTS.TAGID=TAGS.TAGID AND
MEASUREMENTS.TIMEOFMEASUREMENT>='08/12/2013 10:00:00' AND
MEASUREMENTS.TIMEOFMEASUREMENT<'08/12/2013 11:00:00'
```

Backup Service

In case you don't make use of a sophisticated database server with features like database mirroring and automated backups, it is recommend to regularly backup the database manually (see Chapter Database Backup) or automatically.

The Backup Service is meant for backing-up an Ms-Access or Ms-SQL-Express automatically at regular intervals (e.g. every day at 07:00) to disk or removable media (e.g. USB-stick). Oracle is not supported by the 'Backup Service'.

To configure/start the 'Backup Service', please click from the 'Menu'-bar->Control->Start Backup Service and the following screen will pop-up:



Schedule: Specify the backup interval and the date and time when you want the next backup to take place. If a backup fails it is retried every 5 minutes. If a backup succeeds the next backup will be scheduled one interval further.

Backup file name format:

The file name of a backup file may start with a certain prefix and end with a certain trail, the file name extension is fixed (.mdb for Ms-Access and .bak for Ms-SQL). The part between prefix and trail can be formatted based on the 'Backup time'. The default format, to prevent your disks becoming overloaded with backup files, is yyymm (e.g. 201104), which will cause max. one backup file per month, even when backing up every day. If a backup file already exists, it will be overwritten with the new one with the same name.

The Date/Time part format string is composed from specifiers that represent values to be inserted into the formatted string. Some specifiers (such as "d"), simply format numbers or strings. Other specifiers (such as "/") refer to locale-specific strings from global variables.

In the following table, specifiers are given in lower case. Case is ignored in format specifiers.

Specifier	Displays
d	Displays the day as a number without a leading zero (1-31).
dd	Displays the day as a number with a leading zero (01-31).
ddd	Displays the day as an abbreviation (Sun-Sat) using the strings given by the ShortDayNames global variable.
dddd	Displays the day as a full name (Sunday-Saturday) using the strings given by the LongDayNames global variable.
m	Displays the month as a number without a leading zero (1-12). If the m specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mm	Displays the month as a number with a leading zero (01-12). If the mm specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mmm	Displays the month as an abbreviation (Jan-Dec) using the strings given by the ShortMonthNames global variable.
mmmm	Displays the month as a full name (January-December) using the strings given by the LongMonthNames global variable.
yy	Displays the year as a two-digit number (00-99).
yyyy	Displays the year as a four-digit number (0000-9999).

Save backup to: Specify the location where a backup file should be saved to, this can be a fixed location on a (network) disk or this could be a removable media storage (e.g. an USB-stick).

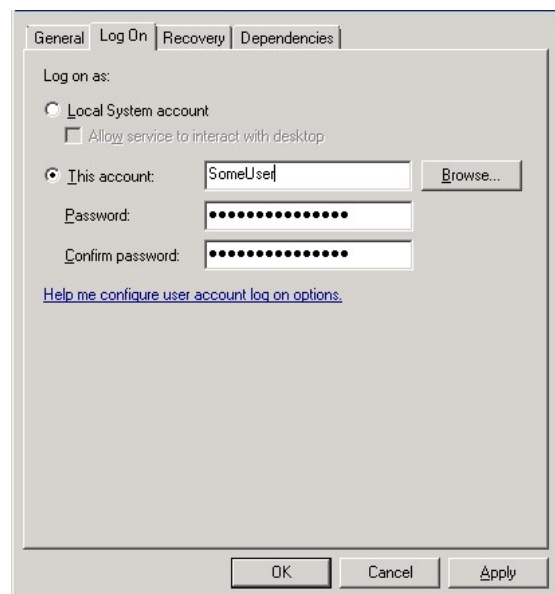
In case of saving to a removable media, the backup file will be saved to the removable media with the lowest 'Driver'-letter. E.g. if two USB-sticks are connected one with 'Driver'-letter E:\ and one with F:\ the backup file will be written to E:\.

As soon as a removable media is attached and the next backup schedule date was already reached, the Service will immediately start to backup to the removable media. When a backup to a removable media is completed the service will play the Windows confirmation sound or the Windows warning sound in case of an error. Errors are logged to ydocinsightsbackup.log and also passed to YDOC-Messenger.

Delete old data: To avoid that your database will reach its physical size limit, you can specify that data older then a certain time (e.g. 1 month, 2 years, etc...) should be deleted after a successful completion of the backup operation.

Starting the Backup Service: After closing the properties screen, you can choose to run the backup utility as a 'Service' or as an 'Application'. When started as a 'Service' the first time, the 'Backup Service' will be installed as a system service. System services will automatically start after re-boot, this assures that it starts running even after an un-attendant re-boot (e.g. after a power-failure).

If a backup has to be made to a network shared disk, this disk may not be available to every user. Default the 'Service' logs in as a "System account". If the "System account" has no rights to the shared network disk, you could setup the service to logon as a different user with the proper rights.

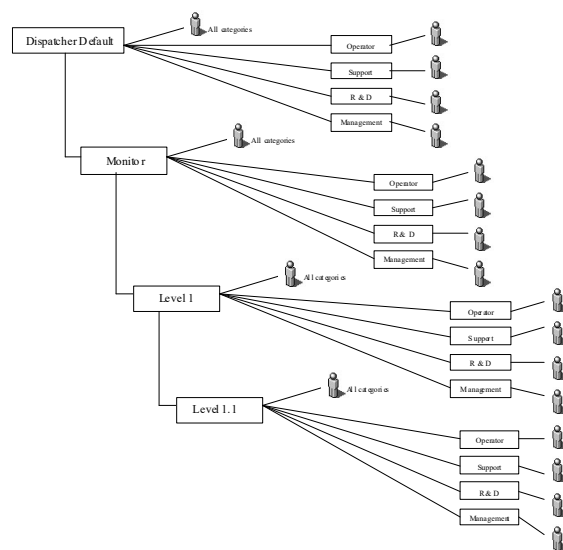


Messenger (Alarm management)

If the alarm management system Messenger is installed alarms (high or low limit violations or if values are not recorded in time) can be passed to the Messenger, which takes care of dispatching the alarm to the right person. A license free version of the Messenger supports the dispatching of alarms to at max. 4 different recipients. Alarms can be send via e-mail, SMS (GSM Modem required) or to other PC's running Messenger. Passing alarms to the Messenger is switched off by default. To enable passing of alarms to the Messenger select 'Start alarm scanner' from the 'Control'-menu. The 'Alarm scanner' is a service that will run in the background and keeps running even if you close YDOC-Insights and will start running after a re-boot automatically. To stop the 'Alarm scanner' select 'Stop alarm scanner' from the 'Control'-menu.

The 'Messenger' is provided with a hierarchical fallback mechanism to ensure that alarms are being noticed.

Messages can be introduced in the system at different levels. When a message is introduced at a certain level, a list will be built of all recipients assigned to that level and who are scheduled at that time. The message will be sent to the first recipient in the list, which must respond within a certain amount of time. If he does not respond in time, the message will be sent to the next recipient, etc. If nobody has responded at all, the list can be tried again and again. If still nobody has responded, then the non-scheduled recipients will be tried once. If still nobody has responded or if there are no recipients assigned to this specific level, the recipients at the parent level will be tried, etc. etc. until the recipients assigned to the 'Dispatchers Default' level.



To be able to distinctively dispatch alarms for each individual tag, an alarm is passed to the Messenger with a (sub)process path. Alarms appear in Messenger under 'Local Monitor' and with (sub)process name "ydocinsightsALARM" and for each YDOC-Insights (sub)location appended with its 'Location Code' and finally append with the 'Tag Code' of the concerned tag and the type of violation that occurred (UNDERRUN for a low limit violation, OVERRUN for a high level violation and TIMEOUT if a value is not recorded in time).

Let's assume a low-level pressure violation of a compressor at YDOC-Insights location "Location A/Site 1/Production/Hall 1/Compressor", than the (sub)process path passed to the Messenger might look like: "ydocinsights**ALARM**/LOCA/S1/PRO/H1/COMP/PRESS/**UNDERRUN**"

The 'Messenger category' for UNDERRUN/OVERRUN alarms is 'Operator' and the 'Messenger severity' is 'Warning' in case of low or high limit violations and 'Error' in case of low-low or high-high limit violations.

The 'Messenger category' for TIMEOUT alarms is 'Support' and the 'Messenger severity' is 'Error'.

Integrated WebServer

YDOC-Insights has an integrated WebServer. When this WebServer is started, the information stored in the YDOC-Insights database can be consulted via a WebBrowser from any computer that has access to the YDOC-Insights WebServer either via an Intranet or Internet. The "YDOC-Insights Standard WebServer" license, which is included in a regular YDOC-Insights license, enables a user to view recent values and pop-up a trend of a single tag over the last 24h. The "YDOC-Insights Extended WebServer" license enables the user to view charts, reports and long term history.

To enable the WebSever select 'Start WebSever' from the 'Control'-menu. The 'WebServer' is a service that will run in the background and keeps running even if you close YDOC-Insights, and will start running after a re-boot automatically. To stop the 'WebServer' select 'Stop WebServer' from the 'Control'-menu.

To consult the YDOC-Insights WebServer, open a WebBrowser and type in the address bar of the Web Browser the name or IP address of the computer running the WebServer.

The WebServer listens by default to TCP port # 80. But this could be conflicting if you have already running another WebServer (e.g. Microsoft Internet Information Server) on your system. The default TCP port# can be changed to any other value (ask your network administrator for a suitable number, to avoid problems with other applications or firewalls). When the port number is not set to 80, you have to provide the port number in the URL (e.g. <http://127.0.0.1:81>)

If reports using HTML5 Canvas rendering don't show up, it could be that your browser does not support the HTML5 Canvas element.

Customizing

The look and feel of the web portal can (within certain boundaries) be customized to your needs, think about fonts and colors. Visual properties like fonts and colors are defined in so called style sheets (*.css). The default style sheets are stored in the *webdata* folder. To customize a style sheet you can copy it from *webdata* to *webdata/profiles/common* and adapt it to your needs. If you are hosting clients and want to give each client his own look and feel you can add additional sub folders to *webdata/profiles* e.g. *webdata/profiles/acme* and you copy style sheets to it that should differ from the default and custom profile. Each individual user can be linked to a specific profile (Edit->Users).

Besides style sheets you could also copy any other file from *webdata* like button or logo pictures (*.gif, *.jpg, etc.). You could even copy HTML and Javascript files, but you should be aware that adapting those files could cause miss behavior of the web portal.

You can also add your own sub folders to the *webdata* folder e.g. *webdata/download* where you can put your own static files to be accessed by any user.

Note: When adapting a HTML file, never remove elements having an 'id' property.

Cross platform

The Web-interface is designed for desktop PC's-, laptops and tabloids' and can be viewed with all mayor browsers (IE-8, FF-8, Chrome-15, Safari-4.0, Opera-11.0, Android-2.3. We have implemented a basic HTML web-interface for smart phones with a tiny screen or basic browser as well, showing recent-values and simple 24h charts. To use this basic interface open the *indexce.htm* page in your browser (e.g. <http://127.0.0.1/indexce.htm>).